SEPTEMBER/OCTOBER 2013 $5.00

POWERLINE

EGSA

The Voice of the On-Site Power Generating Industry

Meet EGSA's David I. Coren 2013-14 Scholarship Recipients

David I. Coren

Plus:

Emergency Power System Enclosures IBC Certification – Fact and Fiction

Smart Grids - Managing Competing Standards: Integration, Not Confrontation

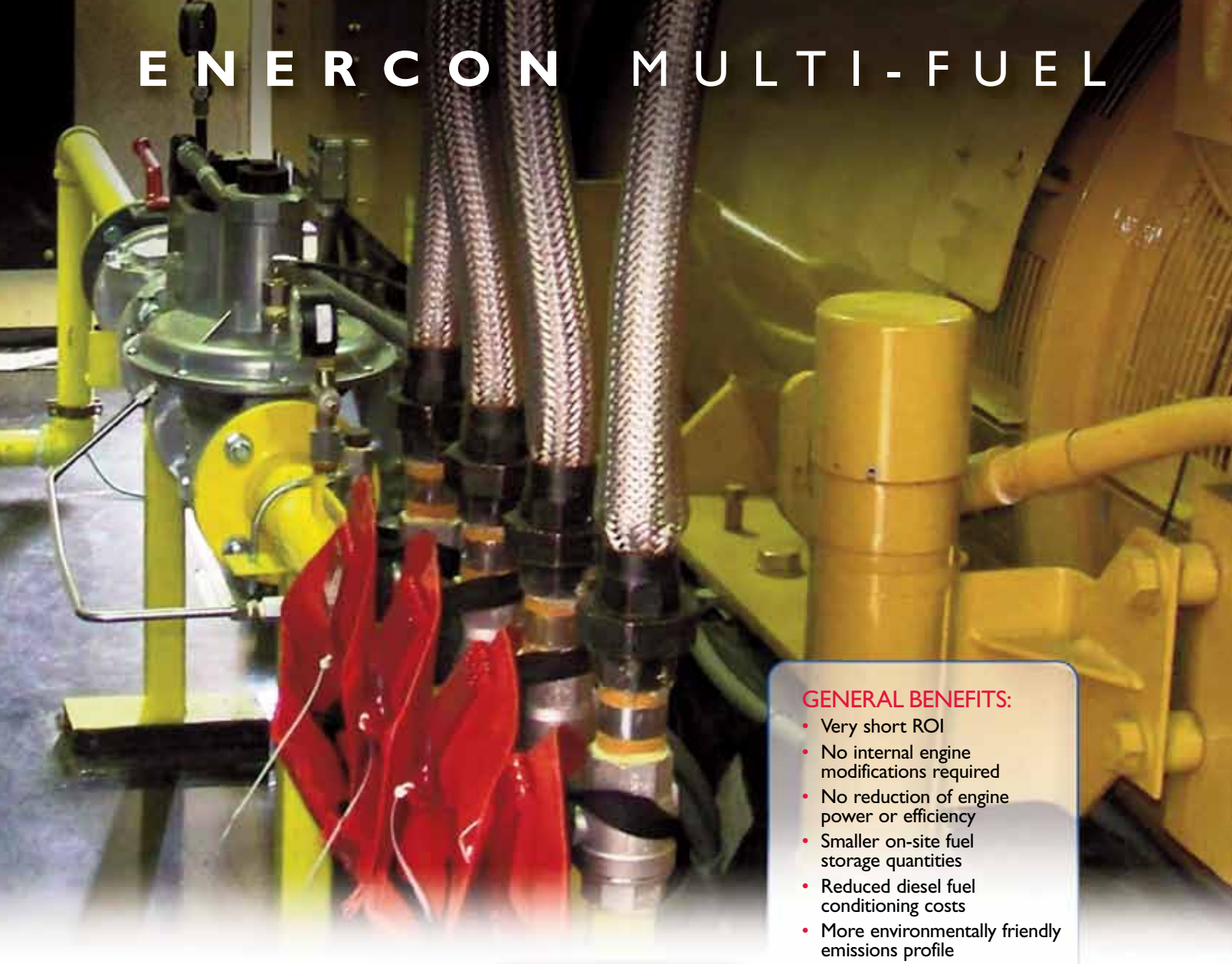
Digital Communications in Electrical Generation Systems

Ring Power Corporation Member Profile

ELECTRICAL GENERATING SYSTEMS ASSOCIATION
1650 South Dixie Highway, Suite 400
Boca Raton FL 33432

PRSRT STANDARD
U.S. POSTAGE
PAID
FORT LAUDERDALE, FL
PERMIT #1956

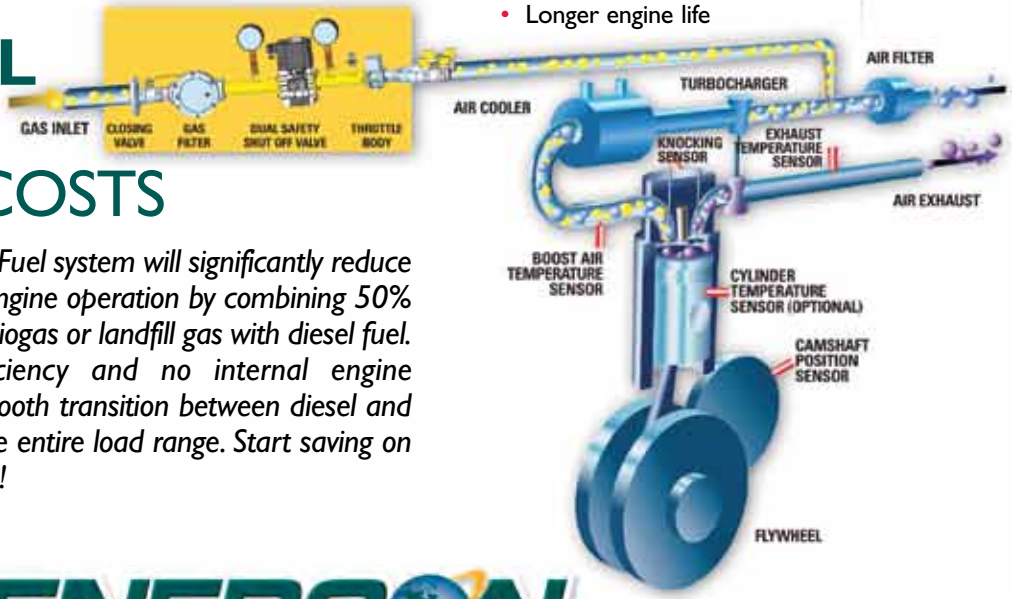
ENERCON MULTI-FUEL



GENERAL BENEFITS:

- Very short ROI
- No internal engine modifications required
- No reduction of engine power or efficiency
- Smaller on-site fuel storage quantities
- Reduced diesel fuel conditioning costs
- More environmentally friendly emissions profile
- Longer engine life

MULTI-FUEL REDUCES HIGH FUEL COSTS



Enercon Engineering's Multi-Fuel system will significantly reduce the overall fuel cost of diesel engine operation by combining 50% to 75% natural gas, propane, biogas or landfill gas with diesel fuel. No loss of power or efficiency and no internal engine modifications are required. Smooth transition between diesel and gas fuels is automated over the entire load range. Start saving on your bottom line. Call us today!

ENERCON ENGINEERING, INC.®

CUSTOM SWITCHGEAR • CONTROL SYSTEMS • PACKAGING • POWER MODULES • ENCLOSURES • COGENERATION

1.800.218.8831 • WWW.ENERCON-ENG.COM

CONTENTS

Volume 48, No. 5 • September/October 2013

Columns

From the Top 7
Strategic Planning Transition

Education 8
George Rowley School of On-Site Power Generation

Codes & Standards 10

Features

Emergency Power System Enclosures IBC Certification – Fact and Fiction 12
Specifying Engineers (RDP) and the "Authorities Having Jurisdiction" (AHJ) Need to Ensure Compliance.

Smart Grids 19
Managing Competing Standards: Integration, Not Confrontation

Digital Communications in Electrical Generation Systems . . . 23

Meet EGSA's David I. Coren 2013-14 Scholarship Recipients . . 31

Ring Power Corporation Member Profile. 36
Another in our series of EGSA Member company profiles.

Departments

Events Calendar 5
Association and Industry events.

Index of Advertisers 6
Who's Who in this issue of *Powerline*.

Association News 35
Updates from EGSA.

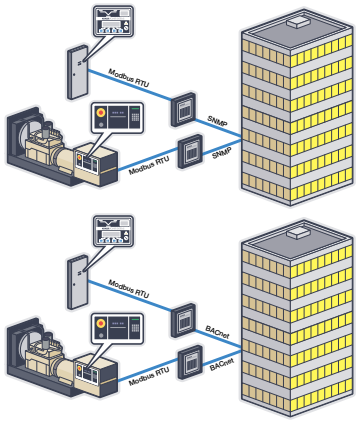
EGSA Membership Application 39
It pays to be a Member of EGSA. Join now!

EGSA New Members 41
Who has joined EGSA in the past few months?

Job Bank 43
Looking for a new job?

Industry News. 45
The latest reports.

On the Cover:
Meet EGSA's David I. Coren 2013-14 Scholarship Recipients; Page 31



Digital Communications in Electrical Generation Systems; Page 23

Data Centers, Hospitals, Critical Care Centers, Nursing Homes, Grocery Stores, Climate-Controlled Storage Facilities, First Responder Facilities…

Increase your generator run time by as much as 400%

BECAUSE YOU NEVER KNOW WHEN YOU'LL NEED STANDBY POWER.

HOERBIGER
GTI Bi-Fuel® — A Product of the HOERBIGER Group

Limited diesel fuel storage and irregular re-supply can often cut emergency generator run time to 24 hours or less. The GTI Bi-Fuel® System can increase your run time by as much as four times that of conventional, all-diesel operation.

GTI BI-FUEL IS THE SOLUTION

This patented system draws low-pressure natural gas into your diesel engine as supplemental fuel. It can substitute up to 70% of your diesel fuel requirement, extending generator run time and reducing your dependence on diesel fuel re-supply. Proven in thousands of installations, GTI Bi-Fuel® is an easy retrofit requiring no engine modification.

Find a distributor near you or learn more about GTI Bi-Fuel® at www.gti-altronic.com.

altronic
GTI Bi-Fuel®

EVENTS CALENDAR

Industry Trade Shows

POWER-GEN International 2013
NOVEMBER 12-14, 2013; Orlando, FL
The world's largest show for power generation, featuring the EGSA On-Site Power Pavilion. For exhibit information, contact EGSA at (561) 750-5575, ext 205 or e-mail Jalane Kellough at *J.Kellough@EGSA.org.*

Conferences & Conventions

EGSA 2013 Fall Technical & Marketing Conference
September 15-17, 2013; Seattle (Bellevue), WA

The Fall Technical and Marketing Conference is held during September and is designed to focus on technical and marketing issues.

NFMT Conference & Expo 2014
March 4-6, 2014; Baltimore, MD

The country's #1 conference and exposition for non-residential building owners; facility managers; maintenance engineers; directors of sustainability; planning; operations and management. EGSA has partnered with NFMT for the third year in a row the Power Source Pavilion. The Power Source Pavilion and educational sessions will provide facility professionals with exclusive access to on-site power solutions. For exhibit information, contact EGSA at (561) 750-5575, ext 203 or e-mail Kim Giles at *K.Giles@EGSA.org.*

EGSA 2014 Spring Convention
March 23-25, 2014; Savannah, GA

EGSA's Annual Spring Convention features educational sessions on a broad range of issues impacting today's On-Site Power industry. More information will be available at *www.EGSA.org* or by calling (561) 750-5575.

EGSA 2013 On-Site Power Generation Schools

The most complete overview of an On-Site Power Generation System available. Gain valuable Continuing Education Units (CEUs) by applying today! For information, visit *www.EGSA.org* or call (561) 750-5575.

Basic Schools
Orlando, FL.....November 12-14*
*To be held concurrently with POWER-GEN International 2013

Advanced Schools
Chicago, IL.....October 21-24

THE POWER TO USE LESS POWER
with HOTflow™

HOTflow™ engine heating technology reduces the energy consumption of standby generators by an average of 55% annually. By keeping standby generators in always ready condition, HOTflow™ enables Emergency Power Systems to meet NFPA start-up requirements while reducing energy use and lowering maintenance costs. Discover how HOTflow™ technology gives the standby generator sector the power to use less power.

HOTSTART® ENGINE HEATING

www.hotstart.com

ADVERTISERS INDEX

Altronic, LLC (GTI Bi-Fuel) 4
Anna, Inc. 21
ASCO Power Technologies 48
Basler Electric 15
Diesel Gas & Turbine Publications 42
EGSA. . . . . 21, 27, 35 & 41
Enercon Engineering, Inc. 2
ESL Power Systems, Inc. 20
Flight Systems 18
Floscan 30
Generator Solutions, Inc. 30
Governors America Corp. 34
Haix 46
Hennig Enclosure Systems 18
Hilliard Corp. 34
HOTSTART 5
Loadbanks Direct, LLC 20
MIRATECH 38
MTS Power Products. 47
Murphy by Enovation Controls 17
NFMT 21
OMNIMETRIX 29
Phoenix Products 28
Pentair. 16
Power-Tronics, Inc. 42
Pritchard Brown 42
Robinson Custom Enclosures 30
Russelectric, Inc. 11
Showmen Supplies Inc. 18
United Alloy, Inc. 9
VDO OE Replacement Parts 44
Woodward. 22

Disclaimer

Powerline Magazine is wholly owned and operated by the Electrical Generating Systems Association (EGSA) and includes advertising, press releases, editorials, and other materials and information submitted by third parties and gathered by EGSA, its publisher, and its agents and from contributors. This information is passed along by EGSA for the interest of its members only. With regard to products, services and information mentioned, advertised, or printed, EGSA, its publisher, and its agents, do not investigate the merit, accuracy or value of the material or information, and make no representations, warranties or endorsements of any kind, and hereby disclaim any responsibility to parties using such products, services or information. Readers' activities are at their own risk.

With regard to editorials, letters to the editor, columns and any other opinions expressed herein, EGSA, its publisher and its agents, do not ratify, adopt, endorse or verify such opinions, and hereby state that any opinions, express or implied, are solely those of the speaker. No information is to be regarded as legal advice and reliance thereon and accuracy of statements is hereby disclaimed.

With regard to information contained herein generally, EGSA, its publisher and its agents, do not guarantee, represent or verify the accuracy of any information. EGSA, its publisher and its agents, endeavor to provide accurate information, but cannot guarantee the accuracy and hereby disclaim liability for any reliance on the information contained herein.

EGSA, its publisher and its agents, make no representations, warranties or endorsements of any kind of the information, opinions, and advertisements contained herein, do not assert the accuracy of any statements and all reliance thereon is hereby disclaimed.

2013 EGSA Officers

President
Debra Laurents, Cummins Power Generation
debra.m.laurents@cummins.com

President-Elect
Vaughn Beasley, Ring Power Corporation
vaughn.beasley@ringpower.com

Vice President
Ed Murphy, Power Search, Inc.
ed@powersearchinc.com

Secretary-Treasurer
Bob Hafich, Emergency Systems Service Company
bobh@emergencysystems-inc.com

Immediate Past President
Michael Pope, Clariant Corporation
Michael.Pope@clariant.com

2013 EGSA DIRECTORS

Brian Berg, Bergari Solutions, LLC
Katie Evans, Diesel & Gas Turbine Publications, Inc.
Steve Evans, ASCO Power Technologies
Todd Lathrop, Eaton Corporation
Rick Morrison, Nixon Power Services Company
Larry Perez, Basler Electric Company
Walter Petty, Atlantic Power Solutions, Inc.
Lanny Slater, GFS Corporation
Kyle Tingle, John Deere Power Systems

EGSA STAFF

Jalane Kellough, Executive Director
Bob Breese, Director of Education
Annie Burford, Manager of Conventions & Meetings
Liz Bustamante, Manager of Membership & Technology
Peter A. Catalfu, Manager of Communications
Kim Giles, Marketing Manager
Debby Amaral-Robinson, Accounting Manager
Herbert V. Whittall, Technical Advisor
Kelly Wilson, Office Manager

SERVICE INFORMATION

For Subscriber orders, change of address, reprints, and back issues (when available), contact:
Editor, *Powerline* magazine
1650 S. Dixie Hwy, Suite 400 • Boca Raton, FL 33432
561/750-5575 • Fax 561/395-8557
e-mail@egsa.org • *www.EGSA.org*

Powerline is published six times per year on a bi-monthly basis. Articles and information submitted for publication should be forwarded to the attention of the Editor at the address above 30 days prior to publication. Technical articles and articles of general interest to the electrical generation industry are actively sought and encouraged. *Powerline* reserves the right to limit information appearing in its pages to that which, in its sole discretion, will reflect positively on EGSA and the industry which it serves.

Throughout every issue of *Powerline*, trademark names are used. Rather than place a trademark symbol at every single such occurrence, we aver here that we are using the names in an editorial fashion only. EGSA has no intention of infringing on these trademarks.

Electrical Generating Systems Association
1650 S. Dixie Hwy, Suite 400 • Boca Raton, FL 33432
561/750-5575 • Fax 561/395-8557
e-mail@egsa.org • *www.EGSA.org*

Debra Laurents
2013 EGSA President
Debra.M.Laurents
@cummins.com

Strategic Planning Transition

The EGSA Strategic Planning committee had one task left before we could disband. After many meetings, conference calls and WebEx sessions, we are ready to transition the strategic planning process.

You may recall that one of our key objectives is to ensure that the strategic plan is evergreen. We want to ensure that it is reviewed on a regular basis, and aligned with the current EGSA environment. Here are just a few benefits of strategic planning:

- Provides a basis for more detailed planning
- Serves as a benchmark for the activities of our organization; sets priorities and direction
- Provides a framework for decision making
- Enables performance metrics
- Improved member satisfaction

The Strategic Planning committee proposed that the core responsibility for the strategic planning process be assumed by the Executive Board. The committee proposal was reviewed and approved at an Executive Board meeting held this summer. There are several advantages to this proposal:

1. Team members will rotate automatically with executive board changes, providing fresh perspective each year as a new Secretary-Treasurer begins his/her tenure.
2. The set rotation will provide consistency in the strategic planning process. It will also naturally cultivate experience and expertise in strategic planning within the Executive Board.
3. The officers are very knowledgeable about the activities of EGSA, as well as any issues or challenges we are facing.
4. The planning process can be incorporated into the existing meeting structure for the officers of the organization.

The officer positions of EGSA are as follows: President, President-Elect, Vice President, Secretary-Treasurer, Immediate Past President and the Executive Director of EGSA. It is important that EGSA staff actively participate in the planning process; our Executive Director offers valuable experience, as well as insight into available resources and funds. I am confident that the complimentary skill sets among our officers and executive director will lead to a quality plan update.

While we understand the necessity to have a team with the core responsibility of updating the plan, we also want this to be a participatory process. As you know, EGSA committees accomplish much of the work of our organization, the work that will carry us into the future. For the last several years, our committees have been responsible for establishing and maintaining strategic initiatives. The committees are an excellent venue for expressing your ideas about how we can meet our goals, as well as recommendations for existing or new programs. The board liaison will take your ideas back to the board of directors for review and discussion. They provide an important two way communication link between the committees and the board of directors.

Going forward, the strategic plan will be reviewed and refreshed on an annual basis. This will allow us to update our strategic goals, and establish new ones as they are achieved. We will document our key measures and deliverables, as well as performance to those deliverables. As part of the review, we will update our SWOT analysis (strengths, weaknesses, opportunities and threats). For 2013, we will complete the review prior to the Fall Conference.

Communication of our plan to our stakeholders is very important. Our communication plan is as follows:

- Any changes to the plan will be reviewed at the Fall Conference with the full Board of Directors, who will vote on the updated plan.
- Members will be updated at the conference during the Meeting of the Members.
- Updates will also be published in *Powerline* magazine.

I'd like to thank the members of the Strategic Long Range Planning Committee for all of their time and dedication to this endeavor:

- Joe Hafich, Emergency Systems Service Company
- Ron Hartzel, Kelly Generator & Equipment
- Jalane Kellough, EGSA
- John Kelly, Kelly Generator & Equipment
- Greg Linton, JRS Custom Fabrication

Their commitment to the strategic planning process and to EGSA has been critical to the development of our strategic plan, and will allow for a successful transition to the Executive Board. ■

Bob Breese
EGSA Director
of Education
b.breese@EGSA.org

George Rowley Power Schools

What a wonderful way to honor a man who gave so much to our Association and had great impact on the education aspects of our Industry! With the Education Committee's assistance, and the help of many others, we are trying to carry on. He is a hard act to follow.

Attendance at the Power Schools has been good so far this year. Down a little bit from last year in the Advanced Schools, but up to capacity (and over in Austin) for the Basic Schools.

Dates	School Type	Location	Students
January 28-31	Advanced	Scottsdale, AZ	27
April 23-25	Basic	Savannah, GA	37
June 24-27	Advanced	Buffalo, NY	25
August 13-15	Basic	Austin, TX	43
October 21-24	Advanced	Chicago, IL	33 (as of 9/1)
November 12-14	Basic	Orlando, FL	23 (as of 9/1)

If you are planning on attending or sending someone to the Rowley Schools, please remember to sign up at least four weeks in advance, so that you can make travel and lodging arrangements. The class limit is 40; when we have more than that number sign up, the extras are placed on a waiting list. Our ability to accept those on the waiting list is dependent on the number of cancellations (usually not known until the week before the class). We can usually make the decision to accept extra students (over 40) two weeks prior to the school. That is when the materials for the school are ordered, printed and shipped. Don't wait until the last minute to register for a school. Plan ahead and register as early as possible.

The Orlando Basic School is held in conjunction with Power-Gen, so if you are planning on attending get registered early and make your hotel reservations as soon as possible. Power-Gen draws a lot of people and finding a hotel can be challenging. The Basic Power School in Orlando will be held at the Hyatt Place Orlando/Convention Center. Go to our website *(www.EGSA.org)* and look in the Upcoming Events section for more information. We get special rates for the students who attend, so they are able to stay in the same Hotel where the school is being presented.

Technician Certification

Eight new technicians were certified overseas in July. These are technicians working in support of our armed forces in foreign countries. They worked with Ferris State University to coordinate the proctoring through a local military command. This is significant in that it shows our continuing growth and support of trained techs, both here in North America and elsewhere. If you have any questions about tech certification don't forget to check the "Frequently Asked Questions" in the Education and Certification section of our website *(www.egsa.org)*.

At the end of July we had a total of 807 Certified Technicians, which includes 106 technicians who have recertified. Total attrition of technicians (technicians who were certified but have not recertified) since the program inception in 2005 is 170. Reminders are sent out to technicians in the three months prior to certification expiring, so it is important that technicians keep their contact information up to date.

Some reminders to technicians:

- If your email or mailing address has changed since you became certified, please email your current information (include your tech ID) to EGSA@ferris.edu and to b.breese@egsa.org. Your current information is needed so we can send reminders when recertification is due, and when updates are made.
- If you cannot find, or do not remember your tech ID please email your name, approximate date you took the test, and your address when you took the test to b.breese@egsa.org. I can look your information up and provide your tech ID.
- If you are registering to recertify, don't forget to provide your tech ID in the appropriate space. Doing so will ensure you don't show up on the list twice.

If you have other questions about our education programs, or anything else EGSA, don't forget to check the website.

As always, if you have any questions, comments or suggestions regarding the EGSA Education programs please contact Bob Breese via an email to *b.breese@egsa.org,* or by phone at 262-225-3107. ■

ENGINEERED SOLUTIONS

UL142 & UN31A TANKS

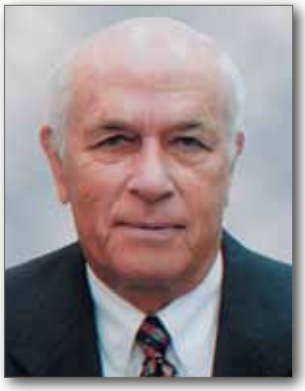
Structural Weldments

We Serve the Power Generation, Industrial Truck & Equipment Markets!

See our USA videos at UnitedAlloy.com • 608.758.4717

UNITED ALLOY, INC.
Custom Metal Fabrication
And Powder Coating

CRAFTSMANSHIP



Herb Whittall
EGSA Technical Advisor
HWhittall@comcast.net

Codes & Standards

A Work Group of interested parties has been organized to work on proposals needed by our Members to update UL 2200 - Standard for Stationary Generator sets. If you are interested in joining this group, please contact Steve at *Sappington_Steve_R@cat.com*.

On July 31, I received an email from UL concerning a change in definitions and requirements for automatic safety shutoff valves and gas flow controls. This change was put on EGSA's LinkedIn page. The change was submitted by Mike Lawson. His proposal changed all of paragraph 41.3.2.1 and its subparagraphs. He added VALVE, AUXILIARY VALVE AND ZERO GOVERNOR REGULATION. This was put out on the EGSA Codes and Standards LinkedIn site for comments. At least 9 Members replied, but there were no negative comments. If you need more information on this please contact me directly, or it will also be discussed at the September 16 EGSA Codes & Standards Committee meeting in Seattle, WA.

Also, UL is calling the STP for UL 2201 – Standard for Portable Generator Sets - for a review in Chicago in October. The discussion items have not been sent to Members at press time.

NFPA 110/111 Committee will meet in Chicago August 14 and 15 for the first review of the changes submitted for the next edition. There has been some controversy, since teleconferencing will not be available. There are some 100 changes submitted taking up 142 pages that we will review. Any significant actions will be discussed at the meeting in Seattle and in future articles.

I received several Appeal Requests concerning the National Electric Code (NFPA 70) that were considered by the NFPA Standards Council that had been decided by the Council. The first was one that appealed the Panel Committees change in the wording of Section 517.30(E). The Council agreed with the appeal and so the following proposed wording was deleted: "Non-locking-type, 125 volt, 15- and 20-ampere receptacles shall have an illuminated face or an indicator light to indicate that there is power to the receptacle".

The second was to ask that the panel action, which changed the required concrete thickness from 2 inches to 4 inches and did not survive ballot action by the committee for approval. The council voted to deny the appeal, so the required concrete thickness for fire protection in sections 695.6, 695.14, 700.10 and 708.10 remains 2 inches.

The third (and most contentious) was denying an exception to the requirement that all portable generator sets have ground-fault circuit interrupter (GFCI) protection manufactured or remanufactured before January 1, 2015. This is being re-appealed as the manufacturers are saying there is no need for this if the user has the connection wiring with a GFCI installed.

The IEEE change in the Color Book system is slowly going to print. I was notified that 4 of the sub-books have been published. IEEE 3001.8 Recommended Practice for the Instrumentation and metering of Industrial and Commercial Power Systems; IEEE 3004.1 Recommended Practice for the Application of Instrument Transformers in Industrial and Commercial Power Systems; IEEE 3008.7 Recommended Practice for determining the Reliability of 7X24 Continuous Power Systems in Industrial and Commercial Facilities; and IEEE 3006.9 Recommended Practice for Collecting Data for Use in Reliability, Availability, and Maintainability Assessments of Industrial and Commercial Power Systems. However, the 3000 Guide Book will not be published until December, 2013.

The ISO committees have been active and the following standards revisions are up for ballot:

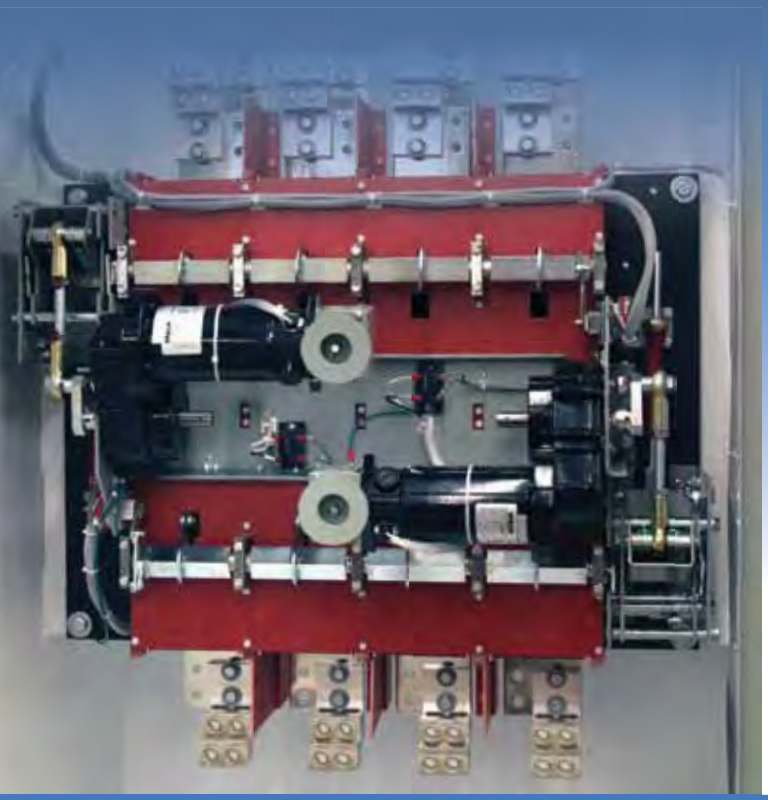
ISO 8178 - Reciprocating Internal Combustion (RIC) Engines – Exhaust System measurement Parts 7 – Engines Family Determination and Part 8 Engine Group Determination.

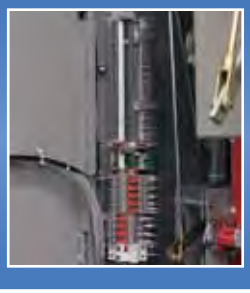
ISO 8528 - RIC Engine Driven Alternating Current Generating Sets – Part 1 – Application, Rating and Performance; Part 2 Engines; Part 4 Control Gear and Switchgear; and Part 6 test Methods.

ISO7967 – RIC Engines –Vocabulary of Components and Systems – Part 4 – Pressure Charging and Air-Exhaust Ducting Systems; Part 6 – Lubricating Systems; and Part 7 – Governing Systems.

The vote is not due until December, so if you need more information and would like to get more information, as always please contact me at *HWhittall@comcast.net.* ■

The best line of automatic transfer switches provides a choice of 30-cycle or 3-cycle closing and withstand ratings





Most transfer switch manufacturers offer some combination of 3-cycle and short-time closing and withstand-rated switches.

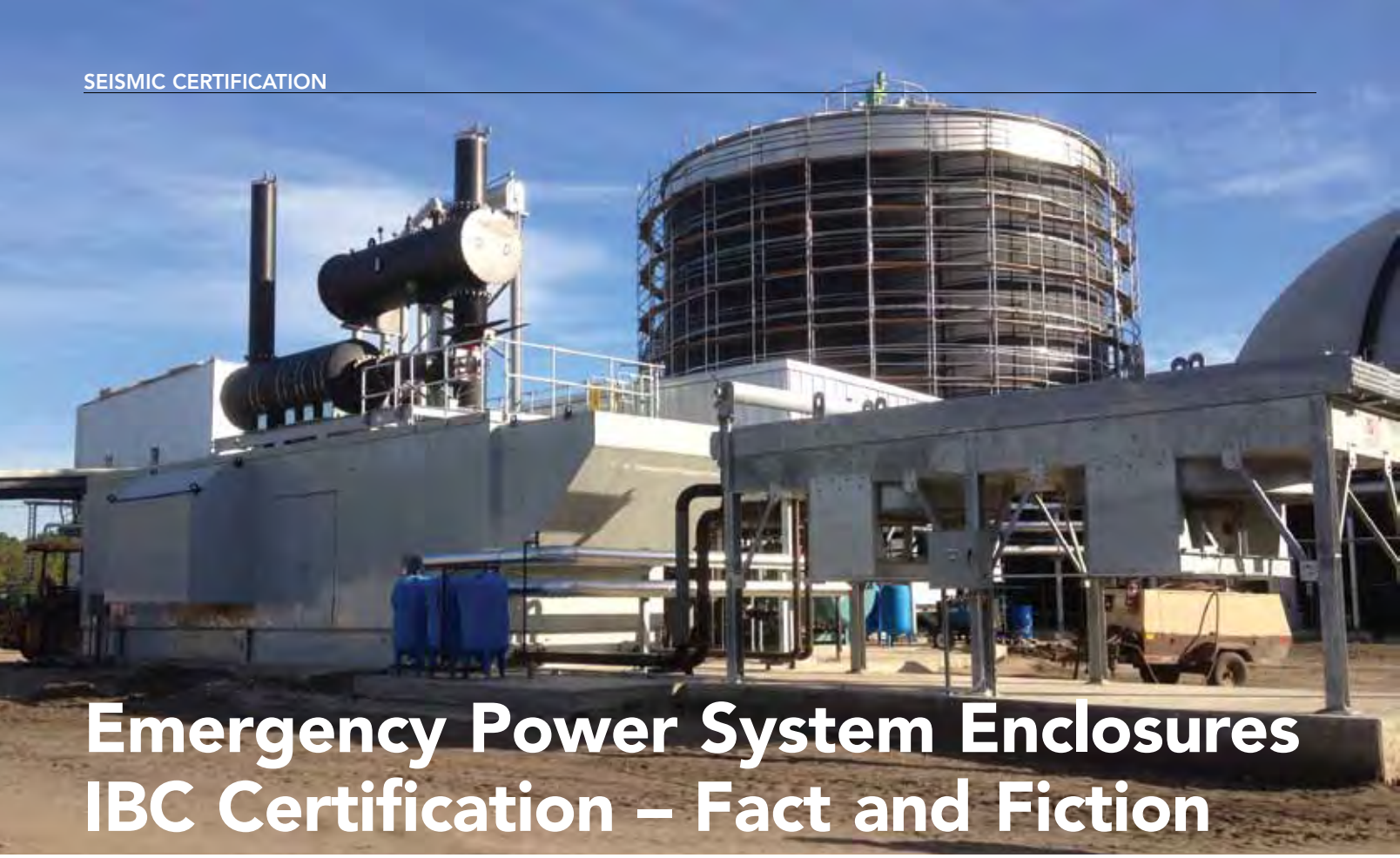
Only Russelectric offers full lines of 3-cycle and 30-cycle rated UL tested, listed, and labeled ATSs and bypass/isolation switches.

Don't settle for less than the best automatic transfer switches… Insist on Russelectric.

Made in USA

www.russelectric.com
1-800-225-5250
An Employee-Owned Company
An Equal Opportunity Employer

Russelectric
Power Control People You Can Rely On



Emergency Power System Enclosures IBC Certification – Fact and Fiction

Specifying Engineers (RDP) and the "Authorities Having Jurisdiction" (AHJ) Need to Ensure Compliance.

By: Steve Stoyanac, National Sales & Marketing Manager, Chillicothe Metal Company, Inc.

Seismic Certification – Fact Or Fiction

Earthquakes are a real problem, and not just in California. Chapter 17 of the International Building Code (IBC) requires manufacturers of designated equipment to provide a "certificate of compliance". Although the IBC document was introduced a decade ago, questions and concerns still surround the IBC-2012 requirements for emergency generator set, sub-base fuel tanks, custom enclosures and other equipment. Even though the IBC is updated every 3 years and is currently in its 5th revision (IBC-2012), there is still ambiguity within the code in terms of compliance for generator set sub-base fuel tanks, enclosures and similar equipment. In the wake of this requirement, Registered Design Professionals (RDPs), Authorities Having Jurisdiction (AHJs), manufacturers and building owners have grasped for concrete direction in obtaining credible certification.

All major generator set manufacturers have been aggressively pursuing IBC qualification for their standard product lines; however this does not include custom sub-base fuel tanks and/or custom enclosures. Most applications of emergency power do not use standard factory enclosed products offered by a generator set OEM. New installations of emergency power above 500kW usually require a custom sub-base fuel tank and a custom enclosure with ancillary items unique to the project design and its application. This could be a hospital, waste water treatment plant, data center, police building or any other important facility. Custom enclosure specifications are written by the RDP to meet all project needs. If a standby power system is required to operate after an earthquake:

- to supply life-safety systems
- to contain hazardous materials in the structure
- or the standby power system is located in an Occupancy Category IV structure

and its failure would prevent continued operation of the facility, then the project specification should be written in a manner that demands accountability by the manufacturer of the custom sub-base assembly and enclosure.

Although there is great effort underway by generator set manufacturers to seismically qualify generator sets by shake table testing for IBC compliance, progress has been slow for manufacturers to seismically qualify custom sub-base fuel tanks and enclosures. Qualification of these products usually requires engineering analysis to supplement testing. IBC qualified generator sets are often installed inside custom designed enclosures that are not seismically qualified. Generator set manufacturers have to make exceptions to specifications for these types of configurations and clarify that custom enclosures are outside of the scope of their certification. Figure 1 is an example of a generator set product seismic qualification label for an MTU On-Site Energy generator set. The label clearly separates the generator set product seismic qualification information from any sub-base and enclosure that it may be attached to or housed within.

onsite energy
MODEL:
SERIAL:
IBC 2000, IBC 2003, IBC 2006, IBC 2009
Tested and Analyzed in Accordance with:
ASCE 7-2, ASCE 7-05, ICC ES AC-156
Ground Level Installations:
Approved to a Design Spectral Response
Acceleration (S_a) of 2.00 g
Rooftop Level Installations:
Approved to a Design Spectral Response
Acceleration (S_a) of 0.67 g *
*When an enclosure and/or fuel tank is
provided, see corresponding labels to verify
system compliance.

Figure 1.
MTU On-Site Energy Generator Set IBC Product Label

What Is The Problem?

Third party certification has been marginalized over the years to the point that engineers, manufacturers and building officials have lost the true meaning of certification. There is no code or standard written to say once and for all (and for everyone to agree on), a definition of certification. The situation is clouded by language within the International Building Code that requires certification by "approved agencies". Considering the code does not well define an "approved agency", this leaves the door wide open. In the least credible path to product qualification, a manufacturer could designate themselves as an "approved agency". This would be very cost effective for them but certainly not credible in the eyes of an RDP, AHJ, or building owner.

Many manufacturers have incorrectly claimed to be certified or have the ability to certify products through "self certification". Certification is not when one sample piece of their equipment meets the requirements of an industry adopted standard/criteria or compliance to a building code section. There is a difference between qualification and certification. "Approval" of an agency does not give the right to an agency to certify products. An Authority Having Jurisdiction (AHJ) giving approval is not the same as certification. There is no consistency on these AHJ requirements. All of these situations have confused the entire manufacturing industry. If the above is not certification, then what is? Let's start by first defining "qualification". That will set the stage for properly defining "certification".

What Is Qualification?

Qualification is intended to ensure that a product design correctly and completely implements a specification and will meet the proper standards and requirements. Qualification may involve passing or successfully satisfying a test or analysis requirement. Records of qualification include appropriate documentation and are officially "on record" as qualified to perform a special function.

Qualification's only interest involves a sample (one time) product performance evaluation by test or analysis. This is the only first step toward certification. Certification includes "third party" review of qualification for compliance to industry standards. Certification also ensures that the product manufacturer has a Quality Control Program so that all future products manufactured will meet the original qualification or product performance. Figure 2 describes the different qualification and certification processes and provides a relative level of credibility associated with each process.

A standard product that is "qualified" by shake table test or engineering analysis would be an example of "Level 4" in Figure 2.

	Qualification Certification Level	Basis of Evaluation	Explanation of Basis	Credibility
Qualified by test or analysis	1	None	Manufacture Provides Certificate of Compliance without any evidence, testing, or evaluations.	0%
	2	Testing or Analysis	Manufacturer qualifies products by non accredited agency or qualifies product by some other means such as analysis.	
	3	Testing at Accredited Laboratory	Testing is performed per a test program that meets ISO 17025 and is accredited.	
Approved Agency	4	(Certified) Qualification Agency Document Preparation	Provide assurance that the equipment testing and qualification meets adopted industry standards and has quality program that meets ISO 9001.	
Certified By Accredited IB	5	QA Record Verification (ICC-ES)	Material Certification Agency requires accredited testing and factory inspection by an accredited IB to criteria less than an ISO 9001.	
	6	Factory Inspection by Accredited Inspection Body (IB)	Listing service verifies qualification documentation to industry adopted standards and performs accredited IB factory inspection to ensure QA manual and records meet ISO 9001.	
	7	Product Certification Agency (PCA)	Performs all above per ISO Guide 65.	100%

Figure 2.

What Is Certification?

Certification is a confirmation of certain characteristics of an object, person, or organization. This confirmation shall be provided by an external review (third party) and includes an assessment. One of the most common types of certification is product certification. This refers to processes intended to determine if a product meets minimum standards and quality assurance. Organizational certification is provided by an accredited agency (not approved) in which the accreditation is given by a body that accredits certifying organizations.

Qualification / Certification? What Does It All Mean?

In summary; product qualification determines if one sample product supplied by a manufacturer meets seismic and/or wind load requirements. In terms of credibility, reference "Level 4" in Figure 2.

Third party product certification by an Accredited Listing Agency reviews the product qualification records and inspects quality assurance procedures which provides a higher level of confidence that the qualified product will consistently meet seismic and/or wind load requirements. This review is simplified if the manufacturer has an ISO Registered Quality Plan. Third party certification is critical for custom products such as power system sub-base fuel tanks and enclosures because they are just that: custom. Qualifying one standard product does not apply to custom manufacturing. Inspection by an accredited listing agency substantiates the credibility of the manufacturer's ability to reproduce the qualified product. In terms of credibility, certification backed by an accredited third party listing agency would result in Level 6 in Figure 2 above.

Is The Certificate of Compliance Worth The Paper On Which It Is Printed?

Now that we know what is required to qualify equipment and certify a manufacturer, how can the RDP, AHJ, and building owners know that product qualification and manufacturer certification is legitimate? If Manufacturer "A" is doing everything correctly and in the most credible manner and Manufacturer "B" is getting his cousin Vinnie to rubber stamp a useless certificate or submittal drawing with no verification of Quality Assurance, and the AHJ signs off and accepts the useless certificate, then which do you think will be cheaper? Which will a contractor purchase? Even NASA goes with the lowest bid. So, a certificate is only as good as the quality assurance behind it. Figure 2 shows how credibility increases with increased quality assurance requirements. It is essential then, that the construction community push forward for qualification and verification by accredited third parties, or certification. The IBC does provide some clarification in the definition of labeling to be performed by knowledgeable individuals, but it delegates the final responsibility to the RDP and AHJ.

To reduce project risk, potential legal liability, and deliver what building owners want and expect; RDPs should require products and product manufacturers to be listed by an "accredited listing agency" to provide the highest level of product certification available for seismic and wind certification. This ensures the product meets minimum standards and quality assurance. An Accredited Listing Service will review the Qualification Agency activities combined with testing (if required) in a qualification document and will also perform "Inspection Body" services to evaluate the manufacturer's QA program. This is the most comprehensive, cost effective and timely measure in which to ensure IBC compliance.

If the manufacturer/supplier for custom sub-base fuel tanks and power system enclosures does not have a listing with an "Accredited Listing Agency", the RDP and AHJ at minimum should demand complete engineering analysis for review in order to verify compliance. The AHJ should at minimum verify that the custom sub-base fuel tank and enclosure are built to the approved design. This is often costly and time consuming. It is not as credible as third party certification, but actual engineering analysis, that can be reviewed for compliance, is much more credible than a stamp on a drawing or useless certificate.

Seismic Source International, LLC listing service provides the highest level of product certification available for seismic and/or wind certification. For further information on Seismic Source International, go to *www.seismic-source.com*.

The accredited certification agency will provide a public document that can be used by the AHJ and RDP to ensure all options provided with the equipment meets the design criteria. Special inspectors on the job site can review the equipment delivered and installed, along with the public documents to ensure that any limitations (such as maximum dimensions) defined in the certification are met. Without QA oversight at the factory or field verification, "self certification" manufacturers can build and deliver anything they want and put any label on their products that may be outside the umbrella of certification of compliance.

Who Is Responsible?

The Specifying Engineer (RDP) is legally responsible to follow the code as a minimum set of requirements or the Authority Having Jurisdiction (AHJ) or owner's more stringent requirements by:

- Including seismic criteria on construction documents
- Scheduling equipment Ip and Designated Seismic Systems
- Including statement of special inspection requirements
- Reviewing and approving certificate of compliance (including shake table test reports and/or engineering analysis)

How Does The International Building Code (IBC) Apply?

The IBC and reference standards have been edited to clearly establish the adopted industry practice where the certification is reviewed by the Registered Design Professional (RDP) and approved by the AHJ. As stated previously, "approval" is not certification. AHJ's are not accredited Inspection Bodies and do not have the oversight by an accreditation body to give certification. For seismic applications, the IBC requires a certification for special seismic equipment. AHJ's can have more stringent requirements. As an example, an AHJ can require certification of equipment for high wind applications. But in all cases, the certification must come from a "third party" and be provided to the AHJ to approve.

The IBC further confuses the certification issue with a requirement that certification is required by approved agencies. The intent is to give the AHJ authority to approve certification agencies. This basically gives the AHJ authority they already possess. Logistically, this is impossible. Most AHJs will not approve agencies from advice through legal counsel such that this approval is an endorsement of the agency. There are thousands

SET YOUR SIGHTS ON 2020

DGC-2020
Digital Genset Controller

IEM-2020
Industrial Engine Module

BASLER CONTROLLERS HIT THE MARK

Genset

- Used in Prime Power, Emergency Standby or Rental applications
- Generator Metering, Protection and Control
- Controls Stand Alone and Paralleled Gensets
- Enhanced generator protection and an integrated automatic synchronizer
- Automatic Transfer Switch Control (Mains failure)

Engine

- Perfect for Engine-driven industrial applications such as Pumps or Compressors
- Engine Metering, Protection and Control
- Expanded programmable logic for pump applications
- Load profiling for easy customization to the application
- Accepts analog inputs for speed and load control
- Easily replaces complicated and expensive PLCs

Visit 2013 Power Gen Booth 2141

Worldwide Headquarters
Highland, Illinois, USA
618 654 2341
info@basler.com

Basler Electric

For more information
www.basler.com/PL2020

Wasselonne, France
Tel: +33 3 88 87 1010
franceinfo@basler.com

Suzhou, PR, China
Tel: +86 512 8227 2888
chinainfo@basler.com

Singapore
Tel: +65 6844 6445
singaporeinfo@basler.com

of AHJ's between California and New York. To get approval from every AHJ is not practical. This is why accredited listing agencies exist.

How Does This Affect The Design Professional (RDP)?

The IBC requires the RDP to review the certification and the AHJ to approve the certification. This requires product manufacturers to have a credible certification as previously defined. The RDP is obligated to review the certificate and public reports (actual test or analysis) to verify the qualification is substantive and there is a Quality Program at the factory. Without a credible certification, the RDP is at risk.

Conclusion

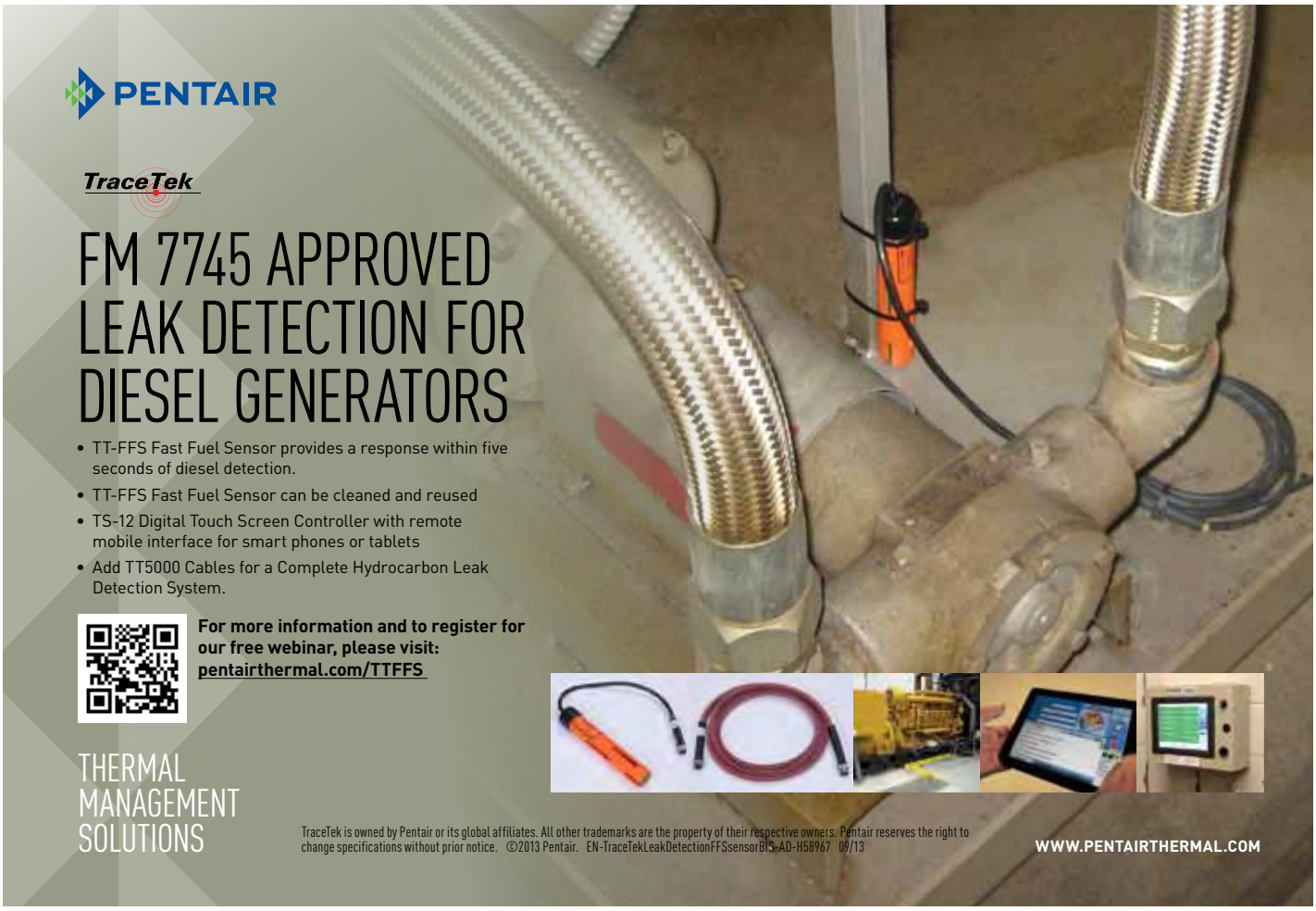
Seismic certification is here to stay. The IBC requires a Certificate of Compliance from equipment manufacturers verifying that the product they supply to a particular job will withstand the design seismic load for that project. It is the responsibility of the manufacturer to provide the proper testing, analysis, and QA program to earn a certificate. It is the responsibility of the RDP and AJH to review and approve the equipment Certificate of Compliance. However, the RDP and AHJ are not equipped to evaluate the QA of a manufacturer and they are not seismic experts. Therefore, industry requirement for third party accredited listing of seismic certificates is essential in establishing a legitimate certification process that will require all manufacturers to play by the same rules and provide risk protection to the RDP and peace of mind to the building owner and AHJ. ■

About the Author

Steve Stoyanac *(steves@cmcousa.com)* is the Sales and Marketing Manager for Chillicothe Metal Company, Inc., headquartered in Chillicothe, IL.

A graduate of Whitworth University with a BA in Business Management, Steve began his career in On-Site Power Generation with Cummins Northwest in the late 70's. He has also worked for other notable firms such as HotStart Mfg. and Silex Systems prior to joining Chillicothe Metal in 2009.

Steve is an active member of EGSA, serving two terms as a board member and President of the Association in 2004, as well as numerous leadership roles within the EGSA community. He is currently the Chair of the Revisions Committee for the 5th edition of On-Site Power Generation: A Reference Book as well as an active school instructor for the Rowley School, teaching the "Noise Control" module in the Advanced school curriculum.


PENTAIR
TraceTek
FM 7745 APPROVED
LEAK DETECTION FOR
DIESEL GENERATORS
• TT-FFS Fast Fuel Sensor provides a response within five seconds of diesel detection.
• TT-FFS Fast Fuel Sensor can be cleaned and reused
• TS-12 Digital Touch Screen Controller with remote mobile interface for smart phones or tablets
• Add TT5000 Cables for a Complete Hydrocarbon Leak Detection System.
For more information and to register for our free webinar, please visit:
pentairthermal.com/TTFFS
THERMAL
MANAGEMENT
SOLUTIONS
TraceTek is owned by Pentair or its global affiliates. All other trademarks are the property of their respective owners. Pentair reserves the right to change specifications without prior notice. ©2013 Pentair. EN-TraceTekLeakDetectionFFSsensorBIS-AD-H58967 09/13
WWW.PENTAIRTHERMAL.COM

Murphy knows...
Power Generation!

POWER-GEN

NOV. 12-14, 2013 ORANGE COUNTY
CONVENTION CENTER, ORLANDO, FL
VISIT US IN BOOTH 2553

More Products, More Solutions for all your application needs.

Find out more about Murphy's Power Generation products at: www.fwmurphy.com/all-egsa
Phone: 918-317-2655

MEMBER EGSA

MURPHY®
by ENOVATION CONTROLS

1311262 6-13

ISN'T EASY BETTER?

You'll Be Up and Running In Minutes!

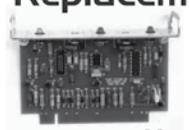
Our Generator Inlet Cabinets offer a **SAFE, EASY** and **CONVENIENT** way to connect to emergency temporary power.

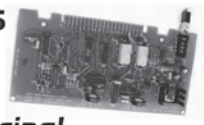
- Weatherproof Enclosure with Stainless Hardware
- 20" x 30" Cabinet Rated Up to 800A
- 48" x 36" Cabinet Rated Up to 2800A
- Lockable with Cords Connected

SHOWMEN SUPPLIES Inc.

Call Us
800-334-9630
www.ShowmenSupplies.com

Replacements for over 65 Onan® Control P/Ns
- Obsolete & Current - Save Hundreds on OE pricing!





Rebuildable "Universal" Voltage Regulators
·All Built in the USA - 2 Yr. Warranty!

ATS & Generator Cont. Reman Svc. - Ave. 3 Day Turn-Around; 1 Yr. Warranty

ASCO® Basler® Cat® Generac® Onan® Kato® Kohler® Zenith® & Many more - Contact us for our Dealer Price List!

Put the G-MAN On the Case!

FLIGHT SYSTEMS
207 Hempt Road, Mechanicsburg, PA 17050
Toll-Free: 800-403-3728 Fax: 717-590-7327
www.flightsystems.com

QUALITY IS NOT OPTIONAL

Hennig Enclosure Systems is committed to quality in every process, from sales through engineering, manufacturing, and service.

We believe that our customers want a partner that…

> **Is Attentive From "The Get Go" –** Our total commitment to customer service is unmatched in the industry. Our sales quotes are turned around at lightning speed with full attention to detail and at a price that can't be beat.

> **Provides Innovation & Customization –** With our experienced degreed engineers, Hennig can design anything you need from basic enclosures and tanks to fully customized models with every imaginable option.

> **Believes That Quality Is Not Just "A Given" –** Hennig is ISO 9001 certified, and our stringent quality standards must be met or exceeded for every process.

> **Won't Leave 'Em Hanging –** Our service and follow-up is unlike any other, with service centers strategically positioned throughout the United States, Canada, and Mexico.

Give us a call today and experience why Hennig Enclosure Systems should be your number one partner for your power packaging needs.

1-888-HENNIG6 (1-888-436-6446)
www.hennigenclosuresystems.com

HENNIG® ENCLOSURE SYSTEMS

Smart Grids

Managing Competing Standards: Integration, Not Confrontation

By Dr. Kai Strübbe, Earl Eiland and Dr. Karl Weber, TÜV SÜD

Challenges we need to address in the future include the volatile nature of energy supply sources and the creation of an even more efficient and sustainable supply infrastructure. Managing these challenges will require our power grid to become significantly more flexible. To reach this goal, all components and all connected systems will have to interact intelligently and, most importantly, appropriately to situations in real time. The transformation of our electricity networks into smart grids must be based on standards. But which one (or ones)? Taking the United States as an example, this article describes the challenges and opportunities encountered along the way to smart grids.

National and international infrastructure systems, such as the Internet, transportation and telecommunication networks, are changing more fundamentally than ever before. This applies particularly to our power grids, which must cope with the continual connection of new power generators and users and with increasing levels of interconnection. As observed by David C. Plummer in the introduction to RFC 826, one of the most frequently used Internet standards, "The world is a jungle in general, and the networking game contributes many animals", yet this extremely heterogeneous IT industry that has successfully controlled the Internet's diversity and propensity to change by effectively using standardization. Now, it is the energy industry's turn to let standardization clear a path through its jungle. In doing so, we may be able to learn from the development of the Internet.

At the core of the smart power grids of the future are embedded measurement and control systems that need to communicate vast quantities of data in real time. The journey from theory to practice is a long one and standards smooth the way. Standardization is imperative if many innovative companies are to contribute their ideas with a minimum of interoperability barriers. However, a look at the world around us shows that uniform standards are not yet widely implemented. Key stakeholders, apart from political decision-makers, are standardization boards such as the US-based Institute of Electrical and Electronics Engineers (IEEE) or the Europe-based International Electrotechnical Commission (IEC). Other stakeholders include power-grid operators and device manufacturers. They must all work together to ensure the numerous devices and solutions are implemented in the best possible manner.

There are a large number of vendors from which smart grid control systems can be assembled. In this market environment, interface standardization, common communication protocols and component interoperability play particularly important roles. After all, the devices must reliably fulfill standardized requirements, which involve more than simply high functionality, usability and interoperability. Primarily, devices must be safe. However, in addition they must be easy to configure and to some extent, offer flexible implementation.

The Quest for a Standard Language

The IEC 61850 standard governs communication between components in energy automation. This standard sets forth guidelines for Ethernet communications between power generators, power users and power distributors. It consequently has the potential to become the standard language of smart grids globally. Using standardized data models and nodes in accordance with IEC 61850 facilitates creating sophisticated smart grid control systems.

The IEC 61850 standard enables existing systems to be integrated seamlessly with new components while ensuring interoperability, as it permits both extensive communication between the connected devices and largely automated bulk grid controls. Further advantages of systems based on the IEC 61850 standard include their modular structure and configuration via XML files. In addition, IEC 61850 has interfaces with the IEC 60870-5-101 and 60870-5-104 transmission protocols which allow a gradual and near-seamless transition to an IEC 61850-based system.

Country-Specific Differences in Implementation

While Europe, large parts of Asia and the Middle East have already started to settle on the IEC 61850 as a smart-grid standard, it is not so accepted in other regions. Reasons include country-specific characteristics in network architecture or the existence of national standards that are given preference. In the short term, national solutions may appear more cost-efficient than the adoption of a standard already in existence. Yet some decision-makers fail to consider that these national solutions might involve considerable follow-up costs and competitive disadvantages later on.

Components are installed in systems with a service life of up to 50 years and must be maintained during this period. Compared to commonly used (standard) solutions, maintenance of proprietary components is likely to be more expensive. In ad-

dition, the manufacturers of proprietary components produce their products for a limited market, representing a potential barrier for exports. Network operators, in turn, have fewer component options and can only select products from a limited number of suppliers. This may increase purchase prices.

The Example of the United States: General Issues

In the United States, acceptance of the IEC 61850 standard is still debated. The Priority Action Plan (PAP) for smart grid standardization includes many protocols that are largely unknown in Europe, such as the DNP3 (Distributed Network Protocol). The European counterparts of this standard are the IEC 60870-5-101 and -104 transmission protocols. In addition, the United States is introducing new standards that are incompatible with the IEC 61850. An example is the smart meter standard, SEP. Further examples of partly overlapping standards governing the control of energy flow include BACnet, LON, Multispeak, the NAESB standards WEQ19, REQ18 and OpenADR.

This situation can be attributed to both general and specific reasons. In the United States, as in Germany, the integration of information and communication technology (ICT) into our power grids sometimes meets with skepticism. Some energy engineers with responsibility for power-grid security fear that the integration of ICT may create security risks similar to those known from the Internet. However, this analogy is not justified. The experts must realize that the use of ICT and embedded systems (embedded measurement and control systems) falls under the scope of industrial security. Smart grid performance requirements have little in common with what is used in environments such as offices. Hence, the hardware and software solutions are markedly different as well.

While industrial security risks do exist, ICT and embedded systems have been used successfully for years in fields including the manufacturing sector, medicine, telecommunications and aerospace. Experience has proved security risks to be controllable in these various contexts. Given this, existing ICT cyber security solutions are useful for smart grids. Examples can be found in automation and control systems and their concepts of functional safety (SIL categories) or quantitative and qualitative risk analyses. In information technology or comprehensive automation in particular, a host of security standards and international standards, such as the IEC 62443, have been established and offer guidance. Network attack and isolation strategy simulations assist in optimizing network security architectures. In addition to these general aspects, we must address specific issues, particularly concerning the selective feature implementation and proprietary extension of these standards.

Load Banks Direct
Built to Last
LBD is your Complete Solutions Provider
Portable
Stationary
Radiator Mounted
Trailer Mounted
Load Banks Direct is a leading manufacturer of high-capacity load banks. We are redefining the load test market with an innovative line of Portable, Stationary, Radiator-Mounted and Trailer solutions - built to last.
855.LBD.CALL sales@loadbanksdirect.com
www.LoadBanksDirect.com
Many popular sizes NOW IN STOCK!
LBD
LOAD BANKS DIRECT

EMERGENCY POWER CONNECTION SOLUTIONS
ESL
POWER SYSTEMS
StormSwitch™
Manual Transfer Switch
100A - 2000A and up to 600VAC
UL/cUL 1008 Listed or in Process
Suitable for Use as Service Equipment
ESL is a leader in the design and manufacturing of manual transfer switches and generator docking stations for emergency backup systems.
TripleSwitch™
3-Way Manual Transfer Switch
100A - 800A and up to 600VAC
UL/cUL 1008 in Process
POWER-GEN
VISIT ESL AT BOOTH #3147
November 12th - 14th
TempTap™
Generator Docking Station
100A - 1600A up to 600VAC
UL 1008 Listed
CSA in Process
Download specifications at www.StormSwitch.com
ESL Power Systems, Inc • 2800 Palisades Dr. • Corona, CA 92880
(800) 922-4188 • info@eslpwr.com • www.eslpwr.com

Specific Issues Encountered in the United States

One reason why the motivation is lower in the United States for using the IEC 61850 as the common standard is that the US has numerous, excellent standardization boards in place. Within a very short time following the publication of the IEC 61850 as the mainstream standard, these US boards (including the IEEE) developed a number of local standards tailored to the US market; most are not based on the IEC standards. These standards concern areas such as connection of smart meters or electric vehicles to the grid and have given rise to innovative and new solutions; other countries could learn and benefit from the US efforts. However, because of incompatibility between standards, these widely differing solutions may instead, hinder investments or cause uncertainty among manufacturers.

Yet this need not be the case. Heterogeneous solutions need not necessarily compete with each other. A close look at the IEEE and IEC standards brings to light that they have many similarities and need not be incompatible. Instead, these standards could be integrated and complement each other. One possibility would be to develop national standards that at least follow the IEC 61850 standard's structure and concept. This type of new standard would improve overall smart grid standards evolution. National standards development should require that any necessary deviations must be well justified. What is more, every deviation should be accompanied by a 'bridge' to the IEC 61850 world, thus maintaining compatibility. The innovation potential of these new standards may pave the way for steady extension and improvement of the IEC 61850 standard. Deviations and heterogeneities without strong justification should be avoided.

Combining the Best of Both Worlds

The development of smart grids involves global challenges that may be best solved through compliance with international standards. In many cases, the necessary standards are already available and need only be observed, applied or disseminated. Many standards published by US and European standardization boards have influenced and benefited from each other. Their integration with IEC 61850 is possible. A large number of countries now benefit, either by implementation or as a guideline, from the IEC 61850 standard. United States initiatives have played a major role in the development of IEC 61850. Success in integrating innovation (such as has originated in the United States) into a standards-based framework, will bring the smart grid one step closer to our actual goal: smart grids that ensure a secure, reliable and cost-effective energy supply, integrating new technologies – while successfully satisfying power demand and meeting the challenges presented by volatile and distributed power generation. ■

About the Authors

Dr. Kai Strübbe is the Head of Embedded Systems at TÜV SÜD AG in Munich, Germany *kai.struebbe@tuev-sued.de*

Earl Eiland is the Sr. Project Engineer, Cyber Security/Smart Grid, TÜV SÜD America, Inc. in Alpharetta, Georgia *eeiland@tuvam.com*

Dr. Karl Weber is the Principal Expert Smart Grid, TÜV SÜD Partner

EGSA is Coming Back to Baltimore in 2014 and We Want You Here with Us!
EGSA is once again bringing the world of On-Site Power Generation to National Facilities Management & Technology (NFMT) Tradeshow.
This is an opportunity you won't want to miss!
Why NFMT?
Stand-by power is a critical necessity for any facility and is often overlooked by the facility manager.
The NFMT Convention is the perfect "End User" show to promote the value of on-site power generation.
The partnership offers myriad marketing opportunities that will attract and engage both EGSA Members and the readers of Building Operating Management and Maintenance Solutions magazines as well as the current and future NFMT attendees.
Contact Kim Giles, EGSA Marketing Manager, today to confirm and reserve your booth space in the EGSA Power Source Pavilion!
K.Giles@EGSA.org (561) 750-5575 ext. 203
EGSA
BUILDING OPERATING MANAGEMENT'S
NFMT
National Facilities Management & Technology
EGSA
POWER SOURCE
ON-SITE POWER PAVILION
MARCH 4 - 6, 2014
www.egsa.org/MeetingsbrTradeShows/NFMTTradeShow.aspx

IT'S A MATTER OF TRUST.

Quality, reliability and experience you can trust.

At Woodward, we consider ourselves members of a larger team – a team that strives to provide the products, services and support experience that make our customers successful. We value strong customer relationships and work to provide world-class technical and sales service, with a focus on local, personal support.

Woodward's switchgear and paralleling generator control products set the industry benchmark for quality and robustness, ensuring the reliability of power systems in countless critical applications worldwide.

easYgen 3500 | LS-5

Power Control Experts

Generator Systems Controls | Switchgear Controls | Protection Relays

www.woodward.com/powergeneration
www.woodward.com/powerdistribution

WOODWARD

Digital Communications in Electrical Generation Systems

By Bill Gross Senior Staff Engineer – Electronics Software KOHLER Power Systems and Nicole Dierksheide Product Manager – Controls & ATS KOHLER Power Systems

Today, electrical generation systems are rarely used as isolated, stand alone systems. More often, they need to communicate with peripheral devices, other generation systems, building management systems or remote monitors. As a result, there are a number of technologies used to enable communication between electrical generation systems and other equipment. If you're involved in specifying, installing or maintaining electrical generation systems, you'll find it helpful to understand how these communication technologies work to meet your needs and the requirements of the building.

It's important to involve all stakeholders when you discuss integrating the existing systems with the electrical generation system. Mutual agreement on the needs and desired functionality will ensure a system that operates as required. Specifying the correct communication technologies at the beginning can save you and your clients hours of frustration as you try to make mismatched systems work or have installation delayed while you order the correct parts.

The Stakeholder Team Should Ask These Questions:

- Who needs to be part of this discussion? Participants could include information technology, building maintenance, production management and energy management personnel.
- What existing systems need to communicate with the electrical generation system?
- What information/status indication do you need to gather from the electrical generation system? What exact data do you need communicated?
- Where does this data need to be sent? How long is the distance from electrical generation system to end device?
- What is the communication hardware and protocol employed by the building management system devices (or other systems) that will connect to the electrical generation system? What hardware and protocol should be specified to operate with the existing systems?

This paper provides information on digital communication systems used in electrical generation systems that will help you understand why the answers to these questions are so important. When the stakeholder team incorporates this knowledge and answers the questions, they'll be able to develop a comprehensive, well-thought-out electrical generation system specification, and avoid pitfalls during installation and use.

What Comprises a Communication System Within an Electrical Generation System?

A communication system consists of two separate, independent components: the hardware and the protocol. You can think of the hardware as the physical devices – things you can touch – and the protocol as the software that allows data to flow between the hardware.

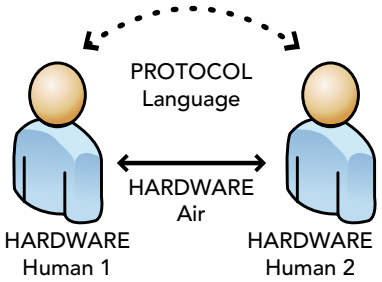


Figure 1. Human Communication Model

In a human model, the hardware elements are the people and the protocol is the language. (Figure 1.) Usually, the communication challenge for humans is the potential for differences in language. Each person must follow certain grammatical rules for the communication to be meaningful. Speed can also be a factor. Most of us have experienced listening to someone who is hard to follow because they talk too fast, or someone else who tries our patience because they talk so dreadfully slow. Similarly, communication networks can experience similar issues that are like a conversation being interrupted by others, or the person you're talking with going off on a tangent and losing the main point of the conversation. Additionally, if there is great enough distance between humans, then additional hardware is required and if the hardware cannot connect, such as through a telephone, the language cannot be transmitted. These are the standards in human communication.

Communication between electronic devices is like communication between people – with similar complexities and issues. In a communication system, the hardware is composed of digital circuitry, which meets precise timing and power requirements put forth by an international standards committee. Because of this standardization, the hardware component of the communication system tends to be straightforward. An everyday example of communication hardware would be a USB (Universal Serial Bus) cable and connectors between a PC and a printer.

The protocol, or language, used to communicate over hardware is open to a much greater degree of variation. There can be multiple protocols that communicate through a given type of hardware. Additionally, some protocols are created as industry standards. Similar to the hardware standards referenced above, protocol standards define the manner in which the language is composed, so two devices connected through the hardware can talk to each other if using the same protocol. If a protocol is not defined by an industry standard, then it is considered pro-

prietary. Information about proprietary protocols is not usually widely shared. Only other developers who know its details can develop products that will be able to communicate through the proprietary protocol.

The use of a USB memory stick is an example of a standard protocol. Think of plugging in a memory stick from one computer to another. Each computer can recognize it because it adheres to a standard. An example of a proprietary protocol is the in-vehicle communication system used by mechanics' diagnostic computers to service your automobile. The communication between the engine computer and the other car components is via proprietary protocols unique to each auto manufacturer.

While preparing an electrical generation system specification, it is vital to gather communication hardware and protocol information for each device or system that must communicate with the new electrical generation system.

The collection of this hardware and protocol data will assure appropriate system functionality. It is also important to identify any adapters that may be necessary to convert from one hardware and/or protocol to another. The following sections describe common communication hardware/networks and protocols used in electrical generation systems.

Communications Hardware and Protocols Used in Electrical Generation Systems

Hardware	Protocol	Connector	Cable	Common Applications
RS-485	Modbus	Euroblock	Twisted-Pair (Belden)	Generation system controller to external systems
	Rbus			
CAN	J1939	9-pin D-subminiature	Cable with connector on end	Engine to generator controller, generator to external devices (guages, I/O, etc.)
	ADEC/MDEC			
	SmartCraft			
	NMEA 2000			
Ethernet	IP	RJ-45 recepticle	Cable with RJ-45 plug and Cat 5 cable	Building management systems
	Modbus TCP			
	SNMP			
	BACnet			
	LonWorks			
USB	Device Mode	Type B receptical	Cable with Type B plug	Genertaor to PC for configuration or data download
	Host Mode	Type A receptical	Cable with Type A plug	Genertaor to flash drive to download or upload data

RS-485

RS-485 Serial Networks (Hardware)

The RS-485 standard defines a physical connection for serial networks. It should not be confused with RS-232, another serial network standard that was typically deployed on computers in the past. Developed in the early 1970s, RS-485 is still extremely popular in industrial communication products today. The RS-485 standard defines the physical manner in which the devices are connected as twisted-pair with a specific configuration of what is transmitted on each connection point. When selecting the cabling, it must be defined as RS-485 twisted-pair. KOHLER® Power Systems recommends Belden as a high-quality cable selection. RS-485 does not define the physical characteristics of the connection points on each end. A Euroblock connector (Figure 2) is typically used on KOHLER generation systems. A Euroblock connector is a pluggable terminal block that uses screw terminals to clamp connecting wires. It provides a quick, convenient way to connect and disconnect electronic devices.

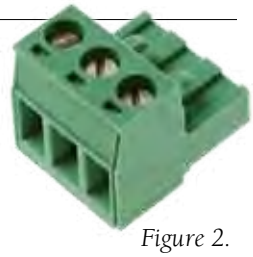


Figure 2. Euroblock Connector

An important characteristic of RS-485 is the need for a terminating resistor. Without a terminating resistor, messages can interfere with each other. A terminating resistor ensures that the communicated message stops at the last device rather than reflecting or bouncing back and interfering with the next message sent. The generation system specification must detail the special steps required to ensure proper operation when employing an RS-485 serial network.

RS-485 Considerations

- RS-485 can be a lower-cost hardware choice compared to other options if the distance is not significant. Because RS-485 requires a twisted-pair cable, it can become costly to run the cable great distances, especially if it needs to be encased in conduit.
- RS-485 can function in distances up to 1200 meters/4000 feet.
- RS-485 works well in electrically noisy environments.
- RS-485 offers relatively lower communication speeds compared to other choices. This is not an issue in most situations, but could become noticeable if large amounts of data are being transferred.

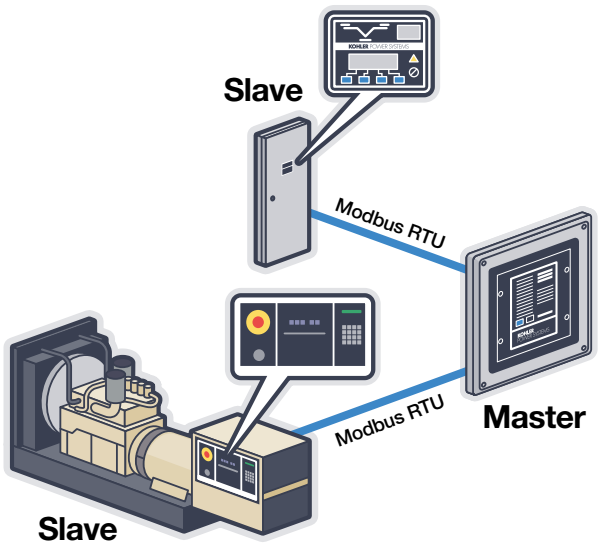
Modbus RTU (Protocol)

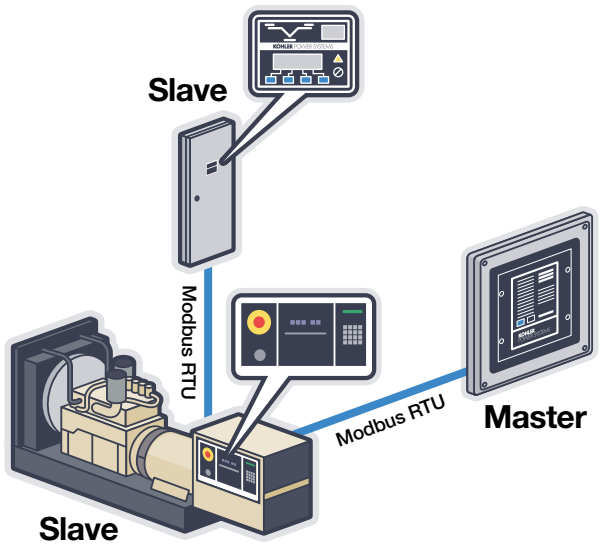
Modbus RTU (remote terminal unit) is a serial communication protocol developed in the late 1970s. It communicates over the RS-485 hardware layer and is the most common implementation of Modbus. It can be used to communicate with building management systems, such as SCADA, and other systems that support the protocol.

The Modbus RTU protocol specifies that an individual device on the network must be the primary (master) device while all other devices are secondary (slave). The primary is the only device that can initiate communication activity. All secondary devices react according to the initiation of the primary.

Rbus (Protocol)

Rbus is a KOHLER® proprietary protocol developed primarily for use with residential and light commercial products. It communicates over the RS-485 hardware layer and creates a holistic solution among KOHLER generators, transfer switches, programmable interface module, load control modules and similar devices. Because it is proprietary, it does not allow communication with non-proprietary systems.





CAN

CAN Networks (Hardware)

CAN (controller area network), also called CANbus, is a communication network that found its way into the power generation market through its use in engines. CAN is the standard network system for the automotive industry and is used by almost all ECMs (engine control module).

CAN is similar to RS-485 in that it defines the physical manner (voltage, current, number of connectors) in which the devices are connected. CAN does not define the mechanical characteristics of the connection points on each end. A 9-pin, D-subminiature-style connector (Figure 4) is often utilized, but other connectors may be employed. KOHLER often uses RJ45 connectors for CAN communication.

Figure 4. 9-Pin D-Subminiature Connector

Another similarity between CAN and RS-485 that should not be overlooked is the need for a terminating resistor to ensure the communicated message stops at the last device rather than reflecting or bouncing back and interfering with the next message sent.

On generation systems, CAN is used to communicate not only with the engine but also with remote input/output boards and external gauges. KOHLER typically uses a dedicated CAN network for the ECM and a separate CAN network for all other communication to keep the "chatter" down on the network with the ECM.

CAN Considerations

- CAN is a relatively lower-cost hardware choice due to the common components and short cable distances.
- CAN functions at a relatively shorter distance (40 meters/120 feet) than other options.
- CAN provides excellent immunity to electrically noisy environments.
- CAN's multi-node architecture (as opposed to master-slave) allows devices to communicate without a single point of failure.
- CAN allows for good communication speeds.

J1939 (Protocol)

The most common protocol used with CAN is J1939, a standard protocol specified by the Society of Automotive Engineers (SAE). This protocol is found on the network running in many cars throughout the world. It is also used by the majority of generator engine manufacturers.

ADEC/MDEC (Protocol)

ADEC/MDEC (advanced diesel engine control)/ (MTU diesel electronic control) are proprietary CAN protocols owned by manufacturer MTU and used for communications with its ECMs.

SmartCraft (Protocol)

SmartCraft is a CAN protocol developed by Mercury Marine for use in boat systems. Boats employ a wide variety of devices, including engine gauges, fire detections systems and radar gear. Because of this, the SmartCraft protocol has been designed to gracefully accommodate identification, addition and removal of devices on the bus.

NMEA 2000 (Protocol)

This protocol was developed by the National Marine Electronics Association for use in marine products. It is used in the marine industry as an alternative to the SmartCraft protocol and J1939.

Ethernet

Ethernet Networks (Hardware)

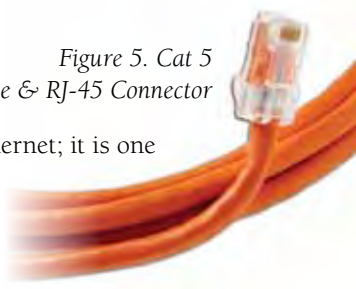


Figure 5. Cat 5 Cable & RJ-45 Connector

Almost everyone is familiar with Ethernet; it is one of the most common ways to access the Internet. The physical manner can vary; for example, as a wired Ethernet connector into a router or a wireless connection via Wi-Fi. Most generation systems that employ Ethernet in their communication solutions use a connector commonly referred to as RJ-45 (remote jack) on the end of a Cat 5 (Category 5) cable (Figure 5).

While the Ethernet network is highly scalable to handle many devices, it does require each device to have a unique ID. Each

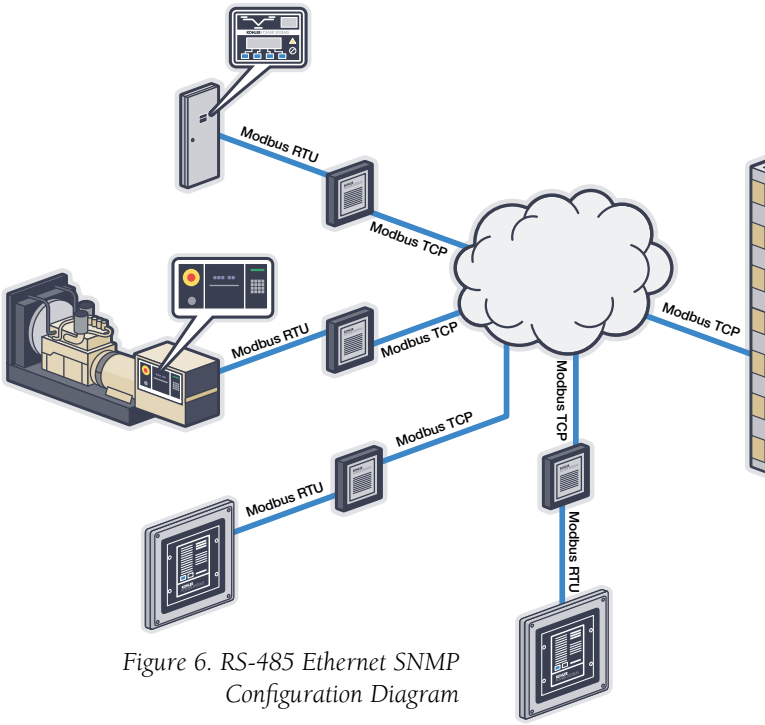


Figure 6. RS-485 Ethernet SNMP Configuration Diagram

device is assigned a unique MAC (media access control) address by the manufacturer.

In addition, while Ethernet makes global accessibility to information possible, it also creates security concerns. As such, many businesses deploy additional security measures, such as firewalls, that prevent external devices from accessing internal systems. These additional security measures, along with the fact that every device must have a unique ID, create technical challenges when deploying an Ethernet solution. In most cases, the company's IT (information technology) group is involved to help configure and set up the system.

Ethernet Considerations

- Ethernet can be costlier than other networking methods due to the additional equipment, such as routers, that it requires.
- Ethernet hardware applications often require involvement of IT experts to get the devices configured and communicating on the internet, intranet or LAN (Local Area Network).
- Ethernet supports very large networks and long distances.
- It integrates well with common networking infrastructure, eliminating the need to be local.
- Ethernet allows for very high communication speeds.
- Ethernet's multi-node architecture (as opposed to master-slave) allows devices to communicate without a single point of failure.

Internet Protocol (Protocol)

The most common Ethernet protocol is the Internet Protocol (IP). It assigns each device a second address called an IP address. Unlike MAC addresses, which are independent of physical device network location, IP addresses follow a numbering hierarchy that corresponds to device locations within the network structure. Therefore, while a device's MAC address remains fixed, its IP address will change if the device is plugged into a different segment of a network. Network managers allocate a block of IP addresses to each LAN in a network and an individual IP address to each device within a LAN.

A device's address may be programmed manually (in which case the address is called a static IP address) or automatically using a protocol called Dynamic Host Configuration Protocol (DHCP). This is a very important detail when writing a generation system specification. If dynamic IP addresses are used for devices, it may be difficult for digital communication systems to discover the device. Typically, the device will be associated with an IP address. If the Internet service provider changes the IP address through DHCP, inbound connections with the device can be lost.

Modbus TCP (Protocol)

Modbus TCP (transmission control protocol) communication over Ethernet is a protocol that generally uses Modbus-to-Ethernet converters to create a Modbus-type network to enable remote monitoring or overcome limitations inherent with Modbus RTU, such as distance or the number of master devices on a bus. There can be numerous masters requesting information from the secondary device.

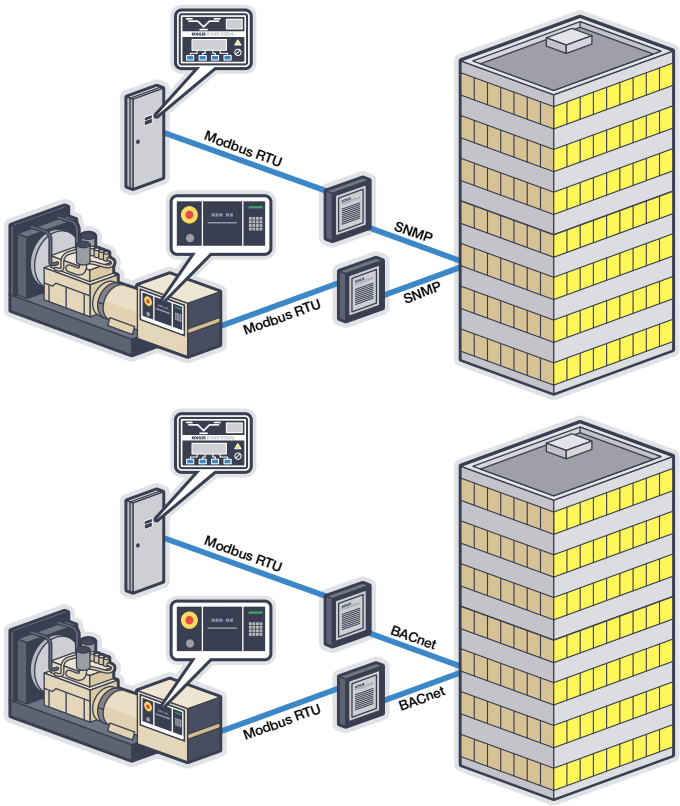


Figure 7. RS-485 Ethernet BACnet Configuration Diagram

SNMP (Protocol)

SNMP (simple network management protocol) is an Ethernet protocol typically used by building management systems to monitor for certain messages from devices. In the case of generation systems, SNMP is monitoring for any events that the system may send, such as a fault from the generator. Once the event is sent out via the protocol, it is "trapped" by, and used to generate an alert through, the management system.

BACnet (Protocol)

BACnet (building automation and control networks) is a communication protocol typically used by building management systems to monitor for certain messages from devices. It is similar to SNMP in that it can be used over a variety of hardware layers, including Ethernet.

LonWorks (Protocol)

LonWorks (local operation network) is a communication protocol typically used by building management systems to monitor for certain messages from devices. It is a rival of BACnet and is focused specifically on the needs of control applications. It has been emerging over the last few years but is still used relatively infrequently.

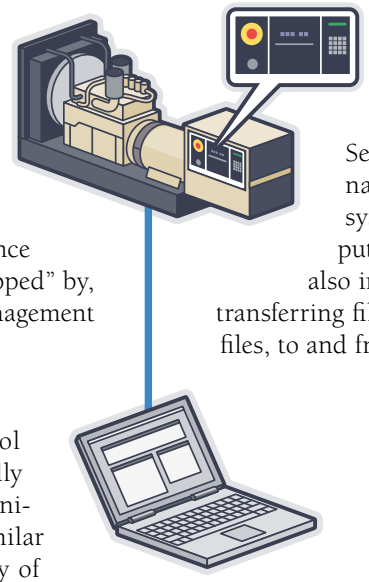


Figure 8. USB Configuration Diagram

USB

USB Communication (Hardware)

Given the proliferation of USB (Universal Serial Bus) applications for personal computers, it's natural to see it used within electrical generation systems – mostly to provide access between a computer and the generation system. This access could also include mass storage devices (e.g., flash drives) for transferring files, such as log files, event files and configuration files, to and from the system.

USB Considerations

- USB is a standard in common use.
- USB provides very fast communication speeds.
- USB operates at relatively shorter distances than other options.
- USB is limited to communication between two devices only, not a network of multiple devices.

USB Device Mode

Generator controllers will communicate via USB device mode with PCs via a program like KOHLER® SiteTech, which is set-up software available only to Kohler-certified technicians. The USB connector on the controller allows technicians to interface with SiteTech; Type B connectors are used for USB device mode communications.

Does your emergency electrical back-up plan hinge on the qualifications and expertise of one person?

Make Sure They are EGSA Certified!

Your power generation system is a complex, sensitive and expensive investment. It requires an expert to install it, monitor its operation and maintain it. Now, more than ever, ensure the equipment that you specify is installed, serviced and maintained by an EGSA-Certified Electrical Generator Systems Technician.

EGSA is a non-profit association poised to help people and organizations just like yours meet the ever-increasing business demands for emergency power solutions while balancing those demands with cost, safety, security and emerging technologies.

The EGSA certification is the industry benchmark that provides you with an objective way to gauge whether someone is qualified to work on your system.

To learn more about EGSA and our Technician Certification Program visit www.egsa.org.

Electrical Generating Systems Association (EGSA)

(561) 750-5575 e-mail@EGSA.org

KOHLER generator controllers supporting USB device mode include:

- DEC 3000 – Industrial generator controller
- RDC / DC, RDC2 / DC2 – Residential generator controllers
- ADC2 / ADC2D – Marine generator controllers

USB Host Mode

Generator controllers that communicate via USB host mode can be reprogrammed using a flash drive (also called a thumb drive or USB memory stick) or can log data to a flash drive. Type A connectors are used for USB host mode.

KOHLER generator controllers supporting USB host mode include:

- ADC2 / ADC2D – Marine generator controllers

Figure 9. Various USA Connectors

Conclusion

There is a large variety of hardware and protocols available today for generator and building systems. The key to choosing the best equipment and systems for your application involves preparation with key stakeholders. Individuals responsible for specifying electrical generation systems must involve all stakeholders to catalog existing devices and systems that need to communicate with the new electrical generation system. These devices may include building management, energy management, security production or other systems. The stakeholders may include information technology experts, building managers, production engineers or other professionals responsible for operations. Using this paper as a guide, this team will develop a thorough description of the current systems' hardware and protocol used by all equipment that will be connected to the generator system. Then, stakeholders should determine how these systems need to communicate, what data must be collected and where all devices are located. With this knowledge, a comprehensive specification can be developed detailing the desired electrical generation system including digital communication hardware and protocol. Do these systems rely on RS-485, CAN, and/ or Ethernet networks? Which protocols are employed on which systems? What is the distance between devices? Answers to these questions and comprehensive, upfront planning will result in better generator system solutions – and ultimately, happier customers. ■

About the Authors

Bill Gross is a Senior Staff Engineer with Kohler Power Systems–Americas. He holds a Bachelor of Arts in liberal studies concentrated on chemistry, physics and math from Indiana University and a Master of Arts in Chemistry from Ball State University. Bill has been with Kohler since 2007 and specializes in remote monitoring, PC applications and embedded controllers for Kohler Power Systems. He developed the initial OnCue® product for Kohler, enabling homeowners to monitor their residential generator set over the Internet.

Nicole Dierksheide is a Product Manager with Kohler Power Systems– Americas. She holds a Bachelor of Science in electrical engineering from the University of Arizona. Nicole has been with Kohler since 2010 and specializes in statutory controls, digital communication and automatic transfer switches for Kohler Power Systems. Power Systems.

Phoenix Products

Your Premier Manufacturer of Generator Enclosures and Base Tanks

High Velocity Hurricane Zone (HVHZ) Enclosures
- Florida Building Code #PDM825
- Miami Dade NOA #09-1216.04

California OSHPD Pre-approved Day Tanks
- 50 to 1000 Gallon Capacity OSP-0187-10

DESIGN • MANUFACTURE • INSTALLATION SUPPORT
Offices in Jacksonville, Fla. and Oakdale, Calif.

904-354-1858
phoenix.sales@phoenixprods.com
www.phoenixprods.com

phoenix products™
A Division of Ring Power Corporation

RELIABILITY. UNINTERRUPTED.

Life Doesn't Stop in the Midst of a Storm.
We Ensure Your Emergency Power Doesn't Stop Either.

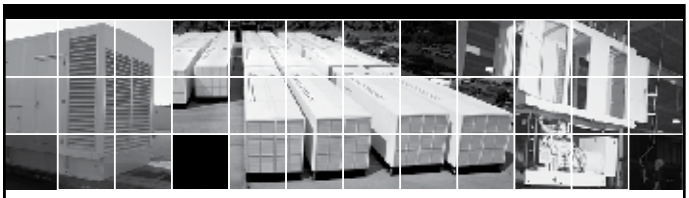
OMNIMETRIX generator monitoring **eliminates over 95% of fail-to-start situations** and now comes with **24/7 technical support**. You get the security of world-class monitoring and the convenience of **one solution for all generator brands**.

Increase Reliability. Generate Peace of Mind. Gain Customer Loyalty.

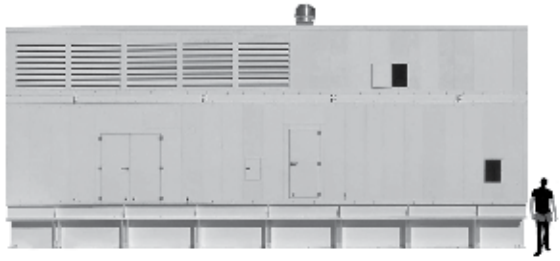
OMNIMETRIX

Keeping life's activities uninterrupted through reliable connections.
www.omnimetrix.net | sales@omnimetrix.net | 888.461.4535
An ACORN ENERGY Company (NASDAQ: ACFN)

Call Today to Order Your Free Dealer-Partner Marketing Storm Kit



Our best work begins by thinking outside the box.



Our best ideas go inside.

At Robinson Custom Enclosures, our state of the art design begins by thinking outside the box. We custom design each enclosure package to meet the customer's need in the most cost-effective way possible.

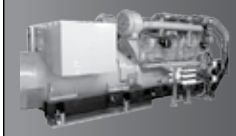
WHERE CUSTOM IS STANDARD

ROBINSON
CUSTOM ENCLOSURES

1740 Eisenhower Drive | P.O. Box 5905
De Pere, WI 54115-5905
920-490-3250 | Fax 920-617-3308 | www.robinsonenclosures.com

Fuel Monitoring Systems for Diesel Generators

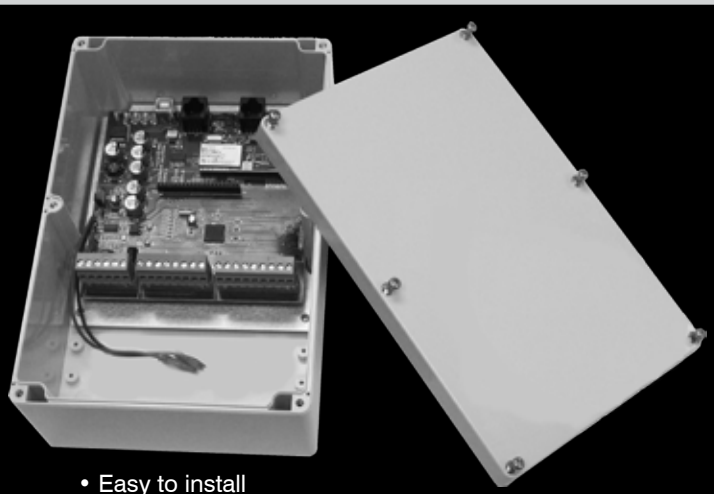
- Fuel Data for NOx Emission Reporting.
- For Diesel Engines from 25HP to 6000HP
- Specializing in Engine Mounted Fuel Flow Sensors for Generator, Aircraft, Marine, Truck, Automotive and Industrial Use for 40+ years
- Computer Hardware and Software for Instrument Panels, CANbus, PC Display/Recording and Remote Access.
- System Prices from $1000 to $4000.



FloScan Instrument Company, Inc.
www.floscan.com
Seattle, WA 206-524-6625

GENTRACKER™
Generator Monitoring System

By Generator Solutions, Inc.



The only
TRULY UNIVERSAL
Generator Monitoring System

- ***ANY BRAND***
- ***ANY SIZE***
- ***ANY TYPE***
- ***ANY AGE***

- Easy to install
- No programming required
- Automatic Monthly Activity Emailed
- Notifications by e-mail and cellular text messaging

- Internet-based
- Remote starts
- Fuel Level
- Modbus connection

- Communication options: Cellular, GPS, Phone, Internet

w w w . G e n - T r a c k e r . c o m

Meet EGSA's David I. Coren 2013-14 Scholarship Recipients

RyLan Collett
Linn State Technical College

Dylan DeSilva
Ohio Technical College

Andy Logemann
Fox Valley Technical College

In 2002, along with the support of the Coren family, EGSA established the David I. Coren Scholarship Program to provide financial assistance to students who plan to seek employment in the On-Site Power Generation Industry.

Since the program launch, your Association has granted a total of 106 scholarships. The value of those scholarships during these last 11 years is a total of $243,000.

This assistance has proved invaluable to not only the students, but to the Industry at-large!

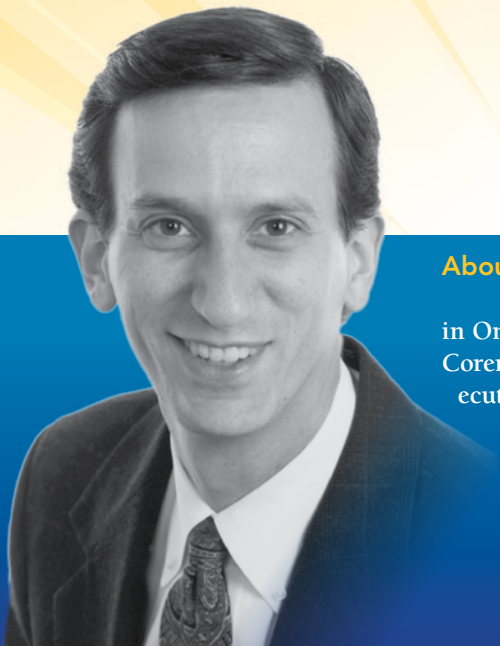
EGSA makes sure that the graduating students are made aware that after a minimum of three years field experience, they are qualified to take the EGSA Certified Technician exam. The benefits to them are invaluable…increasing knowledge and earning power by increasing their value to an employer.

Dwayne Moore
Lincoln Technical Institute

Trevor Price
FABTECH

Stanley "Dylon" Stutz
Linn State Technical College

Matt Voepel
Linn State Technical College



About David I. Coren

After working in the financial sector for nearly a decade, David I. Coren began his career in On-Site Power at Zenith Controls, headed by his father and 1978-79 EGSA President Arthur Coren. David became active in Zenith's business development group. He worked closely with Executive Vice-President and 1998 EGSA President, Ron Seftick and was eventually named President of Zenith Controls. David actively served EGSA as a Conference Presenter; along with serving on and chairing the Convention Planning Committee in 1998. Sadly, in April of 1999, he was diagnosed with a brain tumor and in September of 2000, we lost him.

David is remembered for his desire to succeed, his leadership potential and his ability to motivate his fellow Association Members.

It is with great pride that we present our 2013-2014 David I. Coren Memorial Scholars:

RyLan Collett

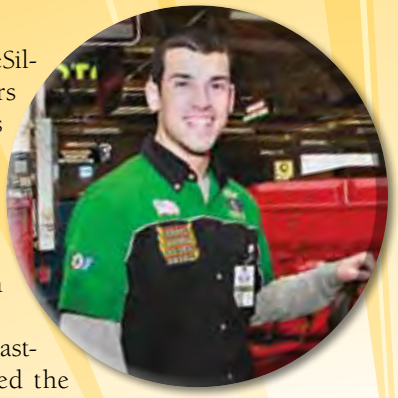
My name is Rylan Collett. I live in Warrensburg, MO on my family's farm. I went to high school in Holden, MO, where I was an active member in the local FFA chapter. I received my state and national FFA degrees.

I attended Warrensburg Area Career Center in Warrensburg, MO, where I received a certificate for automotive technology and after high school, I attended Linn State Technical College.

At Linn State, I obtained an Associates of Applied Science degree in Medium/Heavy Truck Technology and after graduating in May 2013, I decided to go back for a summer course in Electrical Power Generation, where I plan to graduate with an Associates of Applied Science in Electrical in the fall of this year.

Thanks EGSA! This scholarship was very helpful in assisting me with my career.

Dylan DeSilva



Hi! My name is Dylan DeSilva, one of the winners of the 2013 -2014 winners of the EGSA David I. Coren Scholarship. First, I would like to thank your members and all of EGSA for this scholarship! It helps out with school so much.

I am currently living in Eastlake, OH and have attended the Ohio Technical College, which is located in Cleveland. I have studied diesel equipment technology and Standby Power Generation and my GPA is a 3.9!

After school, I would like to find a job back home in Massachusetts, as it would be great to move back, but I will go anywhere in the country if I need to. I have had a few job offers from firms like Caterpillar and Cummins, as well as a couple of locomotive companies.

My goal is to work as hard as I can to achieve the level of lead technician and or supervisor. In my free time I like to go wakeskating, four wheeling and snowboarding.

The David I. Coren Memorial Scholarship Program

Andy Logemann

My family and I live in Appleton, WI, just down the road from the most exciting team in football the Green Bay Packers! We are all die hard cheddar heads, and hope to repeat a Super Bowl performance this year. Go Pack Go!

I am a mid-career changer, going back to Fox Valley Technical College (FVTC) after 20+ years in the construction industry. I wanted a change to more hands-on mechanical work, and to work with electricity-producing machinery.

Going to school to learn to service generators and their diesel engines is extremely interesting and rewarding. I look forward to starting work soon for Wisconsin's Caterpillar dealership, FABCO, as an electric power generation field service technician. I interned with them and had the opportunity to work on some 1,000 ft. long great lake ships that are diesel/electric powered. Exciting stuff!

I have maintained a 3.9 GPA, with every semester achieving the Dean's List. I have learned to work with the "younger generation" and believe they have a lot to offer. My nickname at school is "Silver Fox" which I believe they called me with affection.

I like to hunt, fish and do many other outdoor activities with my family, brothers and 3 dogs. Our current build project is a trebuchet (pumpkin chucker) that I hope to make diesel/electric powered one day.

Electricity is one of the world's most flexible sources of energy, both in terms of the many ways it can be produced and consumed. It powers everything from ships, to buildings, to tiny night lights in our homes. It makes all of our lives better. I look forward to working in this exciting field, and thank EGSA and the David I. Coren Scholarship for helping me achieve this dream.

Dwayne Moore

First and foremost, I want to thank you for choosing me as a representative for your David I. Coren Scholarship. I am very grateful to receive the award as it will help me with my struggle and take some of the financial burden away.

I am currently a student at Lincoln Technical Institute where I am learning to be a diesel technician, so in the near future I can have a promising career and may be able to one day give back to people the way you all have given to me.

I hope to one day become a part of the Atlantic Detroit Diesel family where I can grow and become a Master of the DD15, once again I just want to thank you for choosing me over so many others and have a blessed day!

Trevor Price

My name is Trevor Price and I am from Jefferson, WI, originally from the southwest part of the state, where I grew up in a rural town with a population of only 200.

I enjoy farming and working on things any chance that I get. In my free time, I like to go fishing, hunting and attend many of the surrounding tractor pulls and participate in them personally.

My dad and former boss really got me interested in engines and taught me a lot. I would not be where I am today without them teaching me all that they did. I chose to go into diesel generators because I enjoy a challenge and trying to figure how something works, what powers what, and just plain and simple why it works the way it does.

I went to school through FABTECH in Oshkosh, WI, where I learned the ins and outs of a generator. I have learned some very useful things in the program that I will use and implement everyday in my career. I am very eager to get into the field and implement everything that I have learned and have been taught.

Stanley "Dylon" Stutz

Hello, my name is Stanley Dylon Stutz. Most people refer to me as Dylon. I grew up in Staunton, IL, where I attended high school. While in high school, I participated heavily in FFA.

Growing up, I was always tearing things apart and attempting to put them back together. As I got older, putting them back together became easier. With my interest of how things work, I chose a career in repairing large diesel equipment.

I chose to complete my college education at Linn State Technical College; located in Linn, MO. My first 2 years of school, I completed an Associate of Applied Science degree in heavy equipment technology. The summer after completing my first degree, I opted to complete a program in which I earned my Associate of Applied Science degree in Electric Power Generation.

I graduated from the generator program on August 20, 2013. This 3-month course is the primary reason I chose to attend Linn State. While attending college I maintained a 3.93 GPA and earned a spot on the Dean's List every semester. I was also inducted into the Phi Theta Kappa Honor Society.

My hobbies include horseback riding, customizing vehicles and farm work. At the present, I have accepted a position with Kienstra Illinois LLC, maintaining their fleet of trucks. I am still actively seeking long term employment pertaining to electric power generation. I greatly appreciate the opportunity EGSA has provided to me and others.

Matt Voepel

Greetings! My name is Matt Voepel. I am twenty-one years old and I am from Moscow Mills, MO. I attended high school at Troy Buchanan High School in Troy, MO where I was a member of the FFA Chapter and took agricultural classes, mainly based in mechanics.

During my junior year of high school, I built a sixteen foot flatbed trailer, which I showed in the local Lincoln County Fair and Missouri State Fair. After high school, I attended Pike-Lincoln Technical Center in Eolia, MO, where I earned a certificate in Diesel Technology.

After leaving Pike-Lincoln, I came to Linn State Technical College. In May of this year, I graduated with an Associate of Applied Science Degree in Medium/Heavy Duty Truck Technology. I then decided to return this summer to earn another Associate of Applied Science Degree in Electric Power Generation Technology and I plan to graduate later this year. ■

Qualifying for the Scholarship

- **A candidate must be enrolled (or accepted) as a full-time student at a Vocational-Technical School, Community College or a two-year or four-year educational institution.**
- **If the candidate is entering their first year of studies, they must include an acceptance letter from the school.**
- **Have a declared major that is related to the On-Site Power Generation industry.**
- **Have and maintain a cumulative GPA of 2.8 (A = 4.0) or above.**

Academic and personal achievements (merit) will be used as the primary basis for the award of a scholarship. Financial need may be evaluated as a secondary consideration.

For complete Scholarship details please visit *www.EGSA.org*.

CRANKCASE EMISSIONS CONTROL!

DON'T WAIT
Eliminate Crankcase Emissions*

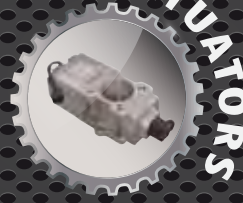
ON STATIONARY ENGINES 300 HP+
MUST BE COMPLIANT BY MAY 3, 2013
*99.97% EFFICIENT AT .3 µm and BELOW
4500 + HOUR CARTRIDGE-CHANGE INTERVALS

The Hilliard Corporation
100 W. Fourth St.
Elmira, NY 14902
Ph: 607-733-7121
http://www.hilliardcorp.com
E-mail: hilliard@hilliardcorp.com

Hilliard
HILCO DIVISION

GOVERNORS AMERICA CORP.®

AFTERMARKET DEPOT
Over 500 Products For All Major Engines & Fuel Systems



HIGH QUALITY PRODUCTS THAT REPLACE:

- PRECISION GOVERNOR
- BARBER COLMAN
- HEINZMANN
- WOODWARD
- BOSCH
- AMBAC

OTHER PRODUCTS:

- AIR-FUEL & IGNITION CONTROLS
- MAGNETIC SPEED PICKUPS
- LOAD SHARING MODULES
- VOLTAGE REGULATORS
- DATA DISPLAYS

info@governors-america.com
413-233-1888

Lights, Camera, Action!

Searching for a way to attract new members to EGSA? How about a tool that visually represents the values of membership… a few testimonials, images of EGSA members networking and working together?

Then, we have a tool for you! If you were able to attend the 2013 EGSA Fall Technical & Marketing Conference, the membership video is located on the USB you received onsite. If you were unable to attend, please visit our EGSA YouTube Channel *(www.youtube.com/watch?v=N9BIqPrpM8U)* and download a copy or forward the link to a prospect!

Finally, if you like what you see and you want to see more, let us know by dropping us a line at *e-mail@egsa.org.* ■

Update Your Listing for the 2014 EGSA Buying Guide

EGSA is asking all primary contacts to update their company listing for the 2014 EGSA Buying Guide and Member Services Directory. The Buying Guide is distributed to more than 30,000 Diesel Progress subscribers as well as at POWER-GEN and NFMT Trade Shows, so it is important that each listing be as accurate as possible.

If you are the primary contact for your company's membership with EGSA, you have been sent an email with instructions on how to update your company listing. Changes need to be made by SEPTEMBER 30, 2013 to be included in the guide. Please contact EGSA if you cannot locate your instructions. ■

EGSA News Announcement - Please join EGSA in welcoming new staff member, Annie Burford!

Annie comes to EGSA with more than ten years of experience in the hospitality industry. For the past 6 years, Annie worked at a lead destination management company in South Florida, providing event services for fortune 500 companies traveling to South Florida for Meetings, Conventions and Trade Shows.

Annie attended the University of Connecticut, with a Political Science Major. She grew up in CT and has been in South Florida for the last 7 years. Her expertise includes all aspects of meeting planning, production, AV, décor, transportation, daytime activities and teambuilding.

Outside of work, Annie's interests include training/riding horses, yoga and travel.

Welcome Annie! ■

EGSA wants to make you an offer, we hope you can't refuse!

On Tuesday, November 12th, make plans to join your EGSA colleagues during Power-Gen International for our annual Power Party at Maggiano's!

We are taking the Power Party to the next level! Won't you join us?

EGSA Electrical Generating Systems Association

Register for the Power Party today! Stop by the EGSA booth, located in the Exhibitor Showcase, for an advance registration form, don't be left "swimming with the fishes."

MAGGIANO'S Little Italy

RING POWER CORPORATION

Another in Our Series of EGSA Member Company Profiles

RING POWER CORPORATION *www.ringpower.com*

As north and central Florida's authorized Caterpillar® Power Systems dealer, Ring Power® has been a full-service resource for electric power, propulsion power, compressed air and temperature control equipment, service, parts and rental for more than 50 years. Headquartered in St. Augustine, Fla., Ring Power Corporation is a privately-held, family-owned business with a workforce of more than 1700 employees at 16 locations from Tallahassee to Pompano Beach.

Our Power Systems division specializes in designing custom, cost-effective solutions to satisfy a diverse range of requirements for prime, standby and temporary electric power; marine and industrial propulsion; compressed air and auxiliary heating/cooling applications. Working alongside Ring Power's experienced engineering and project management teams, our Power Systems sales reps can spec, quote, deliver and, if required, commission even the most challenging project.

After that, our highly skilled, factory trained service technicians will keep it running at peak performance, backed by an umbrella of service, parts and preventive maintenance programs supported worldwide by the Cat® dealer network.

Our products and services include:

- New and used power, temperature control and compressed air equipment for sale and rent
- Diesel and natural gas generators for commercial and residential applications
- Uninterruptible power supply (UPS), ATS/Switchgear and controls
- Industrial diesel and gas power engines
- Marine engines and generators
- Portable diesel, industrial electric and reciprocating air compressors
- Air boosters, industrial vacuums and air accessories
- Parts, service, preventive maintenance (PM) and custom product support programs
- Emergency service 24/7/365

Ring Power Corporation's engine business has experienced multiple incarnations over the course of its first 50 years. From the early 1960s until the shrimping industry boom ended for Northeast Florida about 20 years later, sales of Cat® commercial marine engines comprised more than 50 percent of Ring Power's total engine sales volume.

In the 1980s, as part of a concerted effort to increase awareness and sales of electric power generation systems, Ring Power built a co-generation power plant for its own use to demonstrate the market potential. The company ran this "total energy" natural gas power system in parallel with the utility grid for more than a decade, producing 20 percent more consumable energy than diesel engines and establishing Ring Power's reputation as a leading power systems provider.

"We were the utility for our company," current Senior Vice President and Power Systems Director Vaughn Beasley recounts. "It was a showplace at the time."

In 1989, Caterpillar announced a new business strategy requiring all North American Cat engine dealerships to incorporate a separate business unit to serve the power generation industry. In August of that year, Caterpillar accepted Ring Power's proposal to become an authorized power systems distributor and in 1990 the Power Systems division of Ring Power Corporation was officially born.

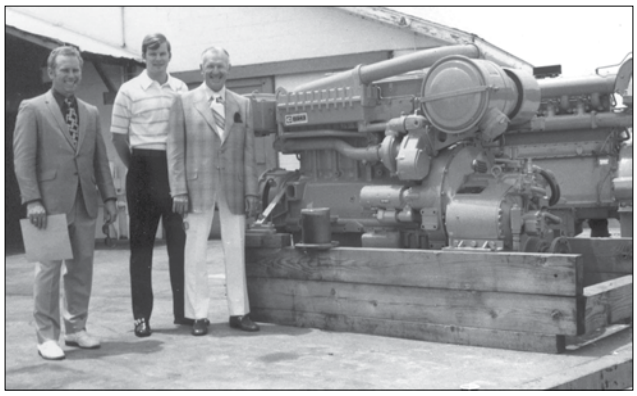
Part of the Cat Power Systems strategy was that, along with separate territories, the engine department would have separate service shops and parts facilities. At the time, Caterpillar was making a serious push into the on-highway trucking market and needed their dealers to have designated engine service facilities to support it. "We had our own building, our own general manager, our own service and parts departments," Beasley says.

But what Vaughn Beasley still values most about his tenure with Ring Power is the importance the company places on building customer relationships. "We've always been able to take

advantage of business opportunities when they come along," Beasley explains, reflecting on his company's growth serving the power industry. "But long-term relationships are what drive this company, and I think the same will hold true for the next 50 years. It's just part of our culture."

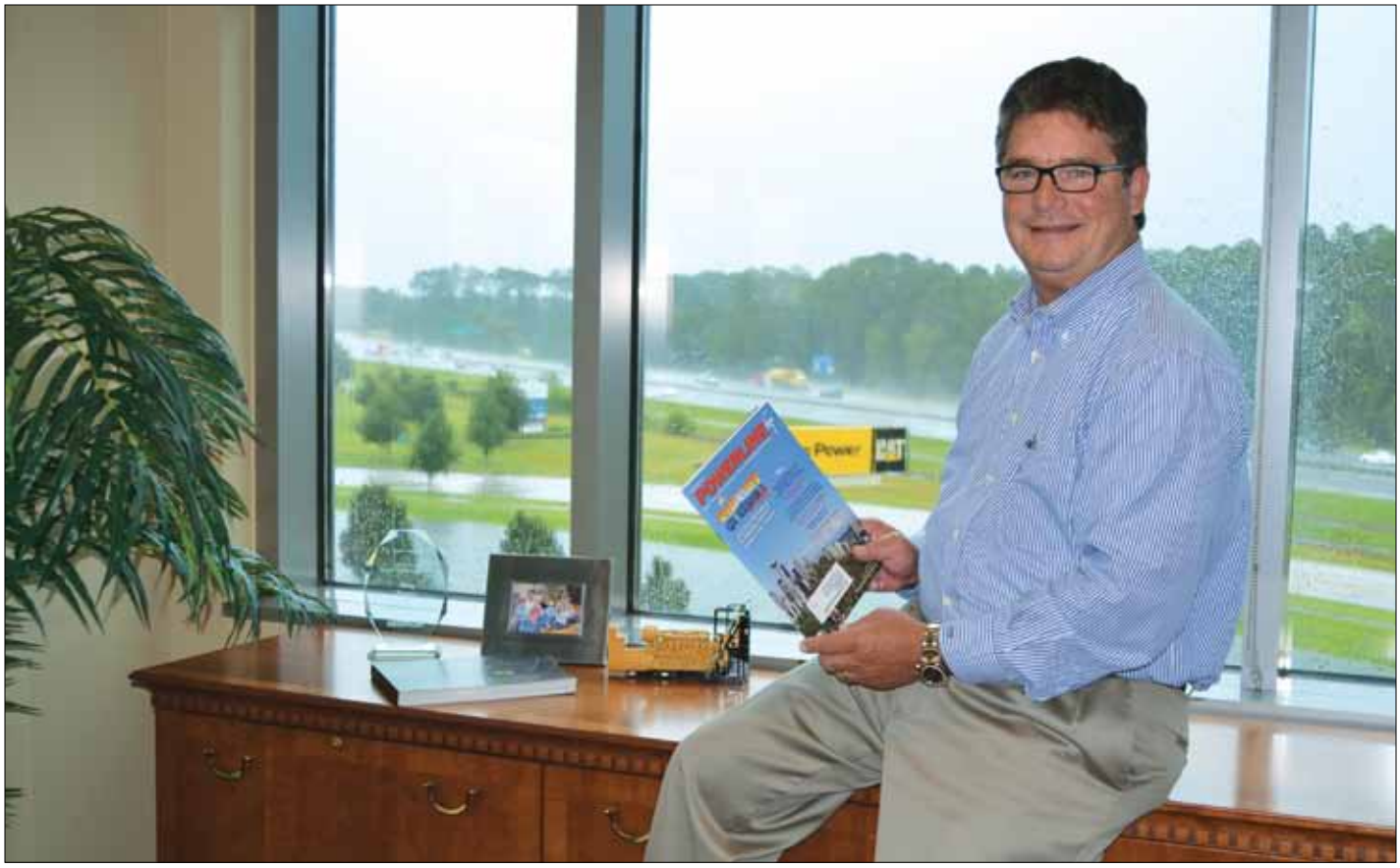
The Power Systems business unit has continued to flourish, along the way adding rental and used equipment sales operations and, in time, a Compressed Air department, specializing in the sale and rental of the finest diesel and electric air compressor products in the industry. In December 2004 Ring Power acquired Phoenix Products to be the exclusive packager for custom designed and fabricated enclosures and fuel systems. Beasley notes, "Phoenix Products was a welcome addition and strategic partner in our continued growth, as well as a fellow EGSA Member."

To maintain that momentum and growth it was obvious to Beasley and other leaders at Ring Power that it would be necessary to expand Ring Power Systems' footprint globally. An opportunity arose in September 2011, when Caterpillar Inc., Ring Power and APR Energy LLC signed an agreement to develop fast-track portable power solutions worldwide to meet the needs of the growing international power projects (IPP) market.



A History Steeped in the Tradition of Cat Yellow
From left to right: Lance Ringhaver [elder son, now Chairman Emeritus], Randy Ringhaver [younger son, current Dealer Principal/Chairman/President], and L.C. Ringhaver [founder of Ring Power Corporation, the original Cat engine dealer business unit for his shrimp boat manufacturing venture, Diesel Engine Sales Company].

Power Systems' Cat Entertainment Services division sparked another opportunity to "go global." Founded in 2000 to provide temporary power and temperature control equipment for special events like music festivals, concert tours, sporting events and broadcast productions, within a decade the CES brand had earned recognition as the premier provider for the North America market. In May 2012 Caterpillar Inc. designated Cat Entertainment Services the global service provider for major international events and production projects. Since then, the division has worked on high-profile projects from Brazil to Europe – a lineup soon to include Russia and the Sochi 2014 Winter Olympics.



Our EGSA President in 2014, Vaughn Beasley, at his desk in St. Augustine.
As an active member for more than 25 years, Vaughn will be the 49th EGSA President next year.

The EGSA Connection

Back in the late-80s, Vaughn Beasley was invited by Bill Young of Industrial Power Systems (IPS) to attend his first EGSA Convention. "Back then, many of the Ring Power vendors and suppliers, like Warner Bauer of Kickham Boiler, John Meuleman of Russelectric, Inc., Herb Daugherty of ASCO Power Technologies and Bill, showed me the ropes," Beasley reports. "Developing a career in Power Generation is no easy task, and at that time, Ring Power joined EGSA to develop strong relationships within the Industry. It was also a great deal for me personally in that I got a solid foundation early on from my networking colleagues within EGSA."

Ring Power Corp. has actively participated with the trade association for more than 30 years. The EGSA Connection continues to evolve, especially now with Beasley as the incoming 2014 EGSA President. When asked how EGSA has brought value to Ring Power Corp, he was quick to reply. "Ring Power has always had a firm foundation in the Power Generation Industry, but we have found tremendous value in EGSA membership because it is the single voice of our Industry. As a company, we make an impact but as a collective group, we are far stronger and get things done!"

And the Ring Power Systems story continues to unfold. In 2012, following Caterpillar's acquisition of MWM, Ring Power was invited to join the first group of Cat dealers to sell and service MWM's electric power products. True to company culture and vision, Ring Power welcomed the addition of the Cat-branded biogas and natural gas engines to its Power Systems product lines. Not only to satisfy the increasing demand for gas engine options, but also to remain at the forefront in the development of sustainable power.

Today, the Power Systems division of Ring Power Corporation provides power generation, industrial, marine propulsion, custom packaging and fuel systems, temperature control and compressed air systems and equipment to a diverse range of businesses and industries. Every lease and purchase is designed and custom-engineered to the customer's specific needs – from sound attenuation to emissions mitigation – and backed by a team of the most experienced, skilled and highly trained engineers and technicians in the field.

In addition to packaging and installation, Ring Power Systems' services include technical support, preventive maintenance programs, load bank testing and a fleet of mobile field service vehicles to bring the same exceptional level of repair, maintenance and overhaul capability to service any make or model at any business or home at any time of the day or night. Beasley knows the Power Systems team of expert sales consultants may get the initial sale but it is the division's unmatched product support that keeps the client coming back. ■

It takes a professional to comply with regulations.
IT TAKES AN ENGINEER TO CREATE SOLUTIONS.
MIRATECH
We don't just make products. We engineer solutions to make sure you are in compliance with air quality and noise regulations in any location worldwide. It pays to stay clean. Call us today to find out how.
STAY CLEAN.
MIRATECH
918.933.6232 | MIRATECHCORP.COM
NSCR • SCR • DPF • SILENCER • AFRC • NESHAP CPMS • FIELD SERVICE • TRAINING • TURNKEY

Application for Membership

ELECTRICAL GENERATING SYSTEMS ASSOCIATION

1650 South Dixie Highway, Suite 400, Boca Raton, FL 33432 • 561-750-5575 • FAX 561-395-8557
E-Mail: *e-mail@EGSA.org* • World Wide Web: *www.EGSA.org*

Under the leadership of its Board of Directors and operating through its various committees and staff, EGSA strives to educate, provide networking opportunities and share relevant knowledge and trends with industry professionals including manufacturers, distributor/dealers, engineers, manufacturer representatives, contractor/integrators and others serving On-Site Power consumers.

1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company _____

Address _____

City _____ State/Province _____

Zip/Postal Code _____ Country _____

Phone _____ FAX _____

Official Representative _____ Title _____

Representative's E-Mail _____ Company's Web Address _____

How did you hear about EGSA? ❑ Web site ❑ *Powerline* magazine ❑ Colleague ❑ POWER-GEN ❑ Other _____

Why are you joining EGSA? ❑ Certification Program ❑ CEU Program ❑ Power Schools ❑ Buying Guide Listing ❑ Other _____

2. Member Classification

Read the Membership classifications below and check the box that describes your firm's classification.

I. FULL MEMBERSHIP

❑ MF **Manufacturer Membership**
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:

1. They manufacture prime movers for power generation.
2. They manufacture generators or other power conversion devices producing electricity.
3. They manufacture switchgear or electrical control devices.
4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
5. They are a wholly owned subsidiary of a firm that qualifies under rules one through four.

❑ DD **Distributor/Dealer Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ CI **Contractor/Integrator Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a Contractor or Equipment Integrator of products listed under Manufacturer Membership, not bound by brand, geographic territory or contractually obligated as a Distributor/Dealer of a specific product. These firms typically purchase products from a Distributor/Dealer, Manufacturer or Retailer, adding value through installation, product knowledge, relationships, unique services, etc., and then re-sell the resulting product to an end-user.

❑ MR **Manufacturer's Representative Membership**
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer's Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ EM **Energy Management Company Membership**
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.

❑ **Associate Full Membership** *(mark appropriate category at right)*
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturer Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

❑ AA **Trade Publication Membership**
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership–Trade Publications.

❑ AB **Trade Association Membership**
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership–Allied Associations.

❑ AC **Engineer Membership**
Any consulting or specifying engineer may apply for Associate Membership–Engineer. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AD **End-User Membership**
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership–User. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AE **Service Membership**
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership–Services. Membership may either be held in the individual's name or the organization's name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AG **Educational Institution Membership**
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership–Education Institution.

❑ AR **Retiree Membership**
Any individual who retires from a member company may apply for Associate Membership–Retired. This classification does not apply to any individual who is employed more than 20 hours per week.

❑ AF **Student Membership**
Any individual currently enrolled at an academic institution may apply for Associate Membership–Student.

Dues Schedule (Use for Section 3)

	Annual Dues	Initiation Fee	TOTAL
Manufacturer	$870	$200	$1070
Distributor/Dealer	$300	$100	$400
Contractor/Integrator	$300	$100	$400
Manufacturer's Rep	$300	$100	$400
Full Associate Member	$300	$100	$400
Energy Management Companies	$210	$100	$310
Regular Associate Member	$210	$100	$310
Retiree Member	*Complimentary*	$0	$0
Student Member	*Complimentary*	$0	$0

NOTE: A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association's Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year's dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

3. Membership Dues (Please fill in the appropriate TOTAL amount from the above dues schedule.)

Membership Dues $_____

Membership Plaque (optional)** $ 49.95**

On-Site Power Reference Book (optional)** $ 125.00**

Florida Residents: Add 6% Sales Tax to ** items $_____

*Continental US Residents add $5 shipping/handing to**items.* $_____
Non Continental US Residents should call EGSA
*Headquarters for shipping charges for **items.* **TOTAL** $_____

4. Payment Method (Payable in US$ drawn on U.S. bank, U.S. Money Order, or American Express)

❑ Check #_____ Amount Due $ _____

❑ Money Order

❑ Mastercard ❑ Visa ❑ American Express

Card # _____ Exp. Date _____

Signature: _____

Print Name: _____

5. Products/Services

Please describe the nature of your business (50 words or less, NOT ALL CAPS). If you are a Manufacturer's Representative or Distributor/Dealer, please indicate which manufacturers you represent and/or distribute for; if you are a student, please provide the name and location of your school, your major and your anticipated graduation date:

_____

_____

_____

_____

_____

_____

Do you buy AND sell equipment? ❑ Yes ❑ No Do you manufacture packaged equipment? ❑ Yes ❑ No

Available Codes:

01 ---Batteries/Battery Chargers
02 ---Control/Annunciator Systems
29 ---Education
30 ---Emission Control Equipment
04 ---Enclosures, Generator Set
05 ---Engines, Diesel or Gas
06 ---Engines, Gas Turbine
07 ---Engine Starters/Starting Aids
08 ---Filters, Lube Oil, Fuel or Air
28 ---Fuel Cells
03 ---Fuel Tanks and Fuel Storage Systems
09 ---Generator Laminations
10 ---Generator Sets
11 ---Generators/Alternators
12 ---Governors
13 ---Heat Recovery Systems
14 ---Instruments and controls, including meters, gauges, relays, contactors, or switches
15 ---Load Banks
16 ---Motor Generator Sets
17 ---Radiator/Heat Exchangers
18 ---Relays, Protective or Synchronizing
19 ---Silencers/Exhaust Systems/Noise Abatement
20 ---Solenoids
21 ---Swtichgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/or Switchgear Panels
22 ---Trailers, Generator Set
23 ---Transformers
24 ---Uninterruptible Power Supplies
25 ---Vibration Isolators
26 ---Voltage Regulators
27 ---Wiring Devices or Receptacles

Enter codes here:

Products sold: _____

_____

Products rented: _____

_____

Products serviced: _____

_____

6. Sponsor(s)

A "Sponsor" is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual's name and company name for our records.

Sponsor Name _____ Company Name _____

7. Official Representative's Authorization

Signature _____ Date _____

NEW EGSA MEMBERS

MF=Manufacturer DD=Distributor/Dealer CI=Contractor/Integrator MR=Manufacturers Rep
EM=Energy Management Co. AA=Trade Publication AB=Trade Association AC=Engineer
AD=End-User AE=Service AG=Educational Institution AR=Retiree AF=Student

Herman Bruce . . . . . AE
Loxahatchee, FL
Herman Bruce, Power Electric Generator Technician
I am a Power Electric Generator Technician working in Southern Asia. My interest is to become certified.

Duke Energy, Inc.. . . . . EM
Raleigh, NC
Brian Cail, Project Manager
Duke Energy is the largest electric power holding company in the United States with more than $110 billion in total assets. Its regulated utility operations serve approximately 7.2 million electric customers located in six states in the Southeast and Midwest. Its commercial power and international business segments own and operate diverse power generation assets in North America and Latin America, including a growing portfolio of renewable energy assets in the United States.

Electro Motors Co. Ltd.. . . . . AE
Port Coquitlam, BC, Canada
Cosimo Geracitano, President
Rewinds & repairs of large generators, motors, transformers and coils of any make. Kato Engineering Inc. authorized parts and service center.

New Castle School of Trades . . . . . AG
New Castle, PA
Ken Miner, Supervisor
We are a trade school teaching power generation as part of our diesel program.

TDX Global. CI
Durham, NC
Tomia Taylor, Director of Operations
TDX Global provides installation, repair, operation & maintenance services for prime, standby, and emergency backup power generation systems and equipment as well as power distribution equipment and switchgear in the home, office, commercial, industrial and government industries.

Lucas Nordby. . . . . AE
Williston, ND
Lucas Nordby, Caterpillar EPG Technician
I am an Electric Power Generation Technician.

Horton, Inc. . . . . . MF
Roseville, MN
Mary Baynes, Sr. Mgr. Mktg. Comm.
Horton, Inc. manufactures and markets fan drives, fans and related components for the heavy, medium and light-duty truck markets, bus, off-highway and industrial markets (compressors, gen sets and refrigeration units).

Paul Dragone . . . . . AR
Sarasota, FL

John Meola . . . . . AR
Lincoln, NE

Shujing Guan . . . . . AF
Stafford, TX
Student at Houston Community College.

Tom Howard . . . . . AF
Crystal Lake, IL
Student at Harper Community College.

Would You Trust the Face of Your Company to Just Anyone?

How well do you understand Power Generation?

Are you in charge of critical power-related decisions for your organization?

Where do you turn to for advice or trusted resources?

Understanding what the Members of the Electrical Generating Systems Association (EGSA) do collectively may be more important than you realize. We are the trade association for the Power Generation Industry. Our members stay ahead of the curve by monitoring trends, standards and best practices.

When disaster strikes, tasks like proper generator installation and maintenance should already be covered. Don't cut corners when it comes to safety and ensure that your back up power system works at peak performance by choosing a manufacturer, vendor or service provider who proudly displays the EGSA logo.

"Cutting off the nose to spite the face"
An expression used to describe a self-destructive over-reaction to a problem.

EGSA Electrical Generating Systems Association

We manufacture, distribute, market and sell; and we also install, maintain and service on-site power equipment. From codes and standards, emerging technologies, best practices, education, technician certification and industry enrichment, EGSA truly is the leading authority in On-Site Power!

1650 South Dixie Highway, Suite 400, Boca Raton, FL 33432 (561) 750-5575 *www.egsa.org*

Power-Tronics, Inc.

P.O. Box 291509, Kerrville, TX 78029 Phone: 830.895.4700
Email: pti@power-tronics.com

Retro-fit Universal Voltage Regulators And Exciter Replacements For Your Electrical Generators And Synchronous Motors

What Can We Do To Help You Repair Or Upgrade Your Electrical Generator?

Sales:
Our sales and technical staff is made up of experienced electrical generator technicians and engineers. We are always ready to help you in selecting a product or helping you with a technical question or application assistance.

Service:
We offer same day repair and service on products sent to us by next day air freight. We can normally ship these repairs back to you the same day we receive them. We also offer field supervision for troubleshooting, installation and startup of our systems.

Quality:
All components used in manufacturing of our products are custom made by us or supplied to us from the highest quality manufacturers possible. We never use cheap, surplus or cloned components. All of our products are tested for operation at least 4 times during manufacturing and a final test before packaging to insure that they meet all required specifications.

Engineering:
We can custom build voltage controls and rectified power supplies for generators, synchronous motors, industrial heat treating, machine tools and special projects. We also manufacture DC to DC voltage regulators and voltage regulators for aircraft ground power units.

Product Support Website:
We have an extensive product support website designed to provide detailed information on all of our products, past and present. Product pricing and online ordering is also provided.

For more information visit our website at:
www.power-tronics.com

EASA EGSA SAMA SAN ANTONIO MANUFACTURERS ASSOCIATION Proudly Manufactured in Kerrville, Texas

- 70,000 ft² of manufacturing space.
- Strategically located for domestic and worldwide markets.
- Over 50 years of shelter manufacturing experience.
- Turn-key systems available.
- Professional sales & engineering staff.
- High performance, maintenance free materials.
- Unparalleled customer service.
- Expertise in code compliance and challenging applications.

BALTIMORE, MD

800.231.2258
WWW.PRITCHARDBROWN.COM

Global Coverage Of The Power Generation Markets

Industry News . . . From Kilowatts To Megawatts

Print, Digital, Online — Your Choice — We Deliver

Visit Us At www.dieselpub.com

DIESEL PROGRESS · dpi DIESEL PROGRESS INTERNATIONAL · Diesel & Gas Turbine WORLDWIDE · GSGnet.net Global Sourcing Guide · GLOBAL GENERATOR SETS.COM

EGSA JOB BANK

USA Central

Generator Power Technician

Central Power Systems & Services, Inc.

Location: St. Louis, MO 63134

Come and join the best! We are expanding into St. Louis, MO and need additional gentechs!! Due to our continued growth, Central Power Systems & Services, Inc. has immediate openings for Generator Technicians at our new St. Louis facility. Applicants must have diesel engine experience and transfer switch knowledge. EGSA Certified preferred but not required. We offer a strong base wage and a full benefit package (including FREE MEDICAL & LIFE insurance) and PAID RELOCATION depending on experience and skill set. Fax a cover letter, salary requirements and your resume to 816-781-4518 or e-mail it to jobs@cpower.com EOE

EGSA Certified Techs Preferred.

To apply: e-mail resume to jobs@cpower.com or fax to 816-781-4518

Application Deadline: 2013-09-30

USA Midwest

Generator Sales Rep - Western KS & OK

Central Power Systems & Services, Inc.

Location: Liberal, KS

Central Power Systems & Services, Inc. - immediate opportunity for a dynamic Generator Sales Rep to be based out of Liberal, KS or the surrounding area (Great Bend, Colby, etc). This position will cover the AOR of Western KS and Oklahoma. We offer a strong base wage, incentive program and a full benefit package (including company car, gas allowance, expense card, FREE MEDICAL insurance, FREE LIFE insurance, paid vacation, profit sharing and 401(k), etc.) and PAID RELOCATION depending on experience and skill set. Fax a cover letter, salary requirements and your resume to 816-781-4518 or e-mail it to jobs@cpower.com EOE

To apply: e-mail resume to jobs@cpower.com or fax to 816-781-4518

Application Deadline: 2013-09-30 00:00:00

USA National

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Houston/Texas/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. We offer competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Submit resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Huntsville/Alabama/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Submit resume to jobs@generator.com

EGSA Job Bank Guidelines

EGSA will advertise (free of charge) EGSA Member company job openings in the Job Bank. Free use of the Job Bank is strictly limited to companies advertising for positions available within their own firms. Companies who are not members of EGSA and third-party employment service firms who service our industry may utilize the Job Bank for a $300 fee. Blind box ads using the EGSA Job Bank address are available upon request; company logos may be included for an additional fee. EGSA reserves the right to refuse any advertisement it deems inappropriate to the publication. To post an EGSA Job Bank ad (limited to approximately 50 words) please visit *www.EGSA.org/ Careers.aspx.*

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Atlanta/Georgia/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Orlando/Florida/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Raleigh/North Carolina/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Baltimore/Maryland/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Jacksonville/Florida/USA

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

Experienced Generator Technician

Power Pro-Tech Services, Inc.

Location: Winston-Salem / Greensboro, NC

We are seeking team players who are committed to excellence and open to learning new ideas. Must have 3-5 years experience in service and repair of all generator makes and models, excellent customer service skills and strong work ethic. Competitive salary and comprehensive benefits. Relocation for qualified candidates.

EGSA Certified Techs Preferred.

To apply: Email resume to jobs@generator.com

USA Northeast

Director of Marketing– USA North East

Kinsley Group, Inc.

Location: Hartford, CT Area

This position will enhance our existing lead qualification and management process, and related market outreach efforts to achieve better market penetration while increasing sales efficiency. Marketing scope includes new industrial equipment, residential equipment, rental equipment, maintenance/service/aftermarket lines of business. The position also includes new company initiatives in other energy and product segments.

To apply: www.kinsley-group.com

Manufacturer's Rep Seeking Principals

Leading Mid-South manufacturer's rep is seeking additional product lines. We have decades of experience in all aspects of the onsite power generation industry. We are interested in adding quality complementary manufacturers to our line of superior products serving the industry. Our record of outstanding success can help you achieve your sales and market share goals. Please respond if you have an area where you desire additional sales and market share.

Please respond to: *J.Kellough@EGSA.org*

(Reference PLMJ13JB-1)

Outstanding Solutions

Innovative information displays for Power-Gen applications.

CAN CockpitView 270

An intelligent 2.7" Information Display that integrates and prioritizes data from multiple sources.

CAN CockpitView 325

Versatile and compact 3.25" display presents important information quickly and clearly.

Centrobase 400

Centrobase instrument clusters provide an affordable, off-the-shelf solution for integrated information display.

CAN*cockpit*

A flexible, CAN-based system, processing data from analog and digital sensors and displaying via a master / satellite instrument architecture.

For more info call:
800-564-5066, or e-mail:
salessupport-us@vdo.com

VDO

VDO – A Trademark of the Continental Corporation

EGSA JOB BANK

Business Development Manager – USA North East

Kinsley Power Systems

Location: Greater New York City Area (Bedford Hills, NY)

A technical sales position which will be responsible for prospecting and driving revenue in the market. The successful candidate should have a solid understanding of the construction electrical market with a particular emphasis on the engineering community's specification writing activities, and preferably have an Electrical Engineering background with experience working with engineers and project managers (as well as contractors and other procurement arms) in the territory.

To apply: www.kinsley-group.com

Industrial Sales Engineer– USA North East

Kinsley Power Systems

Location: Greater New York City Area (Bedford Hills, NY)

This sales position focuses on industrial applications from 20kW to 2800kW, including related equipment (transfer switches, switchgear, etc). The customer base includes engineers, electrical contractors, end-users and OEMs, among others.

To apply: www.kinsley-group.com

Field Service Technicians (Diesel & Gas)– USA North East

Kinsley Power Systems

Location: CT, NY, MA, NH, VT, ME, NJ, PA, RI

Kinsley Power Systems is seeking experienced generator technicians throughout the Northeast. This position is responsible for completing preventive maintenance, repairs and service on standby power generation equipment. Due to the nature of the service business Field Service Technicians must reside within 25 miles of the available territory and have a clean driving record.

To apply: www.kinsley-group.com

USA Southeast

Experienced Generator Technicians

Power Pro-Tech Services, Inc.

Location: Ball Ground/GA/USA

Positions available in Huntsville, AL; Atlanta, GA; Columbus, GA; Montgomery, AL; Jacksonville, FL; Orlando, FL; New Orleans, LA; Baltimore, MD; Raleigh, NC; Winston-Salem/Greensboro, NC; and Houston, TX. Requires 3-5 Yrs Experience in Service and Repair of all Generator makes and models. Excellent salary and comprehensive benefits. Relocation for qualified candidates

EGSA Certified Techs Preferred.

To apply: Send resume to jobs@generator.com

Regional Parts Coordinator

Power Pro-Tech Services, Inc.

Location: Houston/Texas/USA

Research and purchase parts; communicate with field personnel and vendors; maintain parts inventory and database. Requirements:

- 3-5 Years experience in Parts Department in Power Generation Industry.
- 2+ Years experience with OEM generator dealer preferred.
- Excellent communication skills. Computer experience to include Microsoft Outlook, Word and Excel, and ERP system.

To apply: Submit resume to jobs@generator.com

Regional Parts Coordinator

Power Pro-Tech Services, Inc.

Location: Dallas/Texas/USA

Research and purchase parts; communicate with field personnel and vendors; maintain parts inventory and database. Requirements:

- 3-5 Years experience in Parts Department in Power Generation Industry.
- 2+ Years experience with OEM generator dealer preferred.
- Excellent communication skills. Computer experience to include Microsoft Outlook, Word and Excel, and ERP system.

To apply: Submit resume to jobs@generator.com

Regional Parts Coordinator

Power Pro-Tech Services, Inc.

Location: Jupiter/Florida/USA

Research and purchase parts; communicate with field personnel and vendors; maintain parts inventory and database. Requirements:

- 3-5 Years experience in Parts Department in Power Generation Industry.
- 2+ Years experience with OEM generator dealer preferred.
- Excellent communication skills. Computer experience to include Microsoft Outlook, Word and Excel, and ERP system.

To apply: Submit resume to jobs@generator.com

Regional Parts Coordinator

Power Pro-Tech Services, Inc.

Location: Birmingham/Alabama/USA

Research and purchase parts; communicate with field personnel and vendors; maintain parts inventory and database. Requirements:

- 3-5 Years experience in Parts Department in Power Generation Industry.
- 2+ Years experience with OEM generator dealer preferred.
- Excellent communication skills. Computer experience to include Microsoft Outlook, Word and Excel, and ERP system.

To apply: Submit resume to jobs@generator.com

USA West

Generator Service Technician

Colorado Standby Power Generation

Location: Colorado Springs, CO

Growing power generation distributor located in Colorado Springs is looking for an experienced generator service technician to join our service division. Minimum Requirements:

- At least 5 years experience in shop and field generator service
- Proficient in trouble shooting and repair of both gaseous and diesel engines
- Proficient with trouble shooting and testing of alternator, speed controls and governor systems
- Familiar with all major brands of electronic generator controls
- Experienced with load bank testing up to 2MW

EGSA Certified Techs Preferred.

To apply: Email resume to info@coloradostandby.com

Gillette Generators Announces Change in Company Ownership

Charles R. Habic, President/Owner of Gillette Generators in Elkhart, Indiana has announced that he has acquired all business shares from his partners, and is now the sole principal of the company.

Habic, who has served in plant operations and sales/distribution management roles for the last 22 years at Gillette, explained that this move was part of a succession plan laid out by his father, Ray Habic.

"Charlie has done a great job assembling our dealer network, and understands the power generation industry. Plus, he began on the factory floor, so he knows the products", explains Ray Habic, founder of Gillette Generators. "having the business in the hands of someone who cares and appreciates the industry ensures the best possible future for our employees, suppliers and of course, our dealers."

Gillette builds industrial grade portable generators 5-15kW, which compliment the company's main offering, which is 12-400kW gas/diesel standby power generation systems.

"Moving forward, our guidance will focus directly on new products," says Habic. "We know our markets: wastewater treatment, data centers, healthcare, commercial, telecom, oil & gas, bid/spec and high end residential. We are well aware of what we need to bring to these industries for additional market penetration."

"Even though we have been around for 5 decades, we feel today that we have a new dawn peppered with possibilities" said Habic.

For more information, visit *www.gillette-generators.com.* ■

Woodward to Present Energy Market Control Seminars in Calgary, AB (Canada)

Woodward, Inc. announced it will co-host three technical seminars with distribution partner Alberta Governor Service, Inc., October 8-10, 2013 at the Clarion Hotel & Conference Centre in Calgary, Alberta (Canada). The following topics will be featured:

- **October 8:** Steam Turbine, Gas Turbine & Compressor Basics
- **October 9:** Introduction to Distributed Power Generation, Control and Management
- **October 10:** Control of Natural Gas and Bio-Gas Engines, Emissions Workshop

Specifying engineers and end users attending these topic-oriented teaching seminars will expand their knowledge of control strategies for these applications and may benefit from networking opportunities with other energy market professionals. The seminars are open to the public and attendees may register for any sessions of interest. The nominal registration fee includes all session materials, continental breakfast and banquet lunch.

These seminars aim to demonstrate the technical expertise of Woodward and its distribution partners, rather than promote specific products or services; each session qualifies for 6 professional development hours. The subject matter is of a technical nature but is presented to accommodate novice laypersons with minimal experience.

For detailed information on session topics and to register please visit: *www.woodward.com/seminar* ■

MIRATECH Welcomes Three New Employees

MIRATECH Appoints Mike Best as Marketing Director

MIRATECH Corporation, a world-wide leader in emissions solutions for industrial engines, has appointed Mike Best to a Marketing Director position. Based at MIRATECH headquarters in Tulsa, Oklahoma, Best will be responsible for product ROI analysis, coordination of outside creative teams and development of MIRATECH's brand and marketing plan as well as customer and end-user support.

MIRATECH Names Mike Hobbs as Marcellus Shale Account Manager

MIRATECH has promoted Mike Hobbs to a Gas Compression Account Manager position based in Pittsburg, PA. Hobbs will manage and develop Packager and aftermarket end user accounts with a primary focus on the Marcellus Shale region.

MIRATECH Appoints Stewart Matson to Inside Sales Representative

MIRATECH, has appointed Stewart Matson to its Inside Sales Representative position. Based in Tulsa, Matson will provide sales support to MIRATECH's outside sales personnel and fulfill customer and regional sales manager information needs.

Whayne Supply Company Celebrates 100 Years in 2013

Year-long celebration recognizes company history and sets tone for next 100 years

Whayne Supply Company, one of the nation's oldest and largest Caterpillar dealerships, is celebrating its 100th Anniversary in 2013. The Whayne Supply Company centennial commemoration will span throughout 2013 as the company highlights key moments in its history, hosts events for employees and customers, and conducts a series of community service projects.

Entrance to Whayne 100th Louisville event.

While few companies in any industry have withstood the test of time to celebrate their centennial, Whayne Supply Company is proud to be one of just a couple Caterpillar dealers to claim this distinction.

The celebrations and community service events will take place in Louisville and each of its branch cities in Kentucky and southern Indiana. The events will serve as a way to recognize and thank the customers and employees that have helped make Whayne Supply Company successful over the past century.

Whayne Supply Company was founded in 1913 by Roy C. Whayne Sr., who was the sole employee at the time, selling light engines, pumps, wheelbarrows, and bicycles. Whayne began its long-term association with Caterpillar in 1925 and has steadily grown to serve new markets and customers.

The company is now owned by Monty Boyd, who became president in 2005 after serving in various roles at Whayne for 25 years. Under his leadership, Whayne has grown to employ over 1,300 people and now operates 15 facilities in 12 cities across Kentucky and southern Indiana.

"We are privileged to have outstanding, loyal customers and this year we want to take the opportunity to thank them for their continued confidence. As we look to our next 100 years, our commitment will continue," said Boyd. "Our company has always delivered quality products, superior support services, and the highest ethical standards. That's a model we plan to continue into our next 100 years," he said.

For more information about Whayne Supply Company's 100th Year celebration or any of the company's products and services, please call 1-800-494-2963 or visit *www.whayne.com.* ■

Worldwide Power Products Announces Strategic Partnership with Northstar Recovery Services; Attains Registered Vendor Status

Worldwide Power Products (WPP), a power-generation equipment provider to commercial and industrial clients worldwide, announced it has solidified a partnership with disaster recovery firm Northstar Recovery Services. After Hurricane Sandy, Northstar was a pivotal player in bringing relief to businesses in the stricken region, including providing emergency power generators from WPP's inventory. WPP and Northstar are entering into a Master Subcontractor Agreement (MSA) that will streamline the process for Northstar to procure power-generation equipment from WPP in the wake of disasters or for any other business need.

"The increased tropical activity in the Northeast Region is making companies acutely aware of the necessity for both disaster preparedness and rapid post-disaster response," said WPP Executive VP Mark Lum. "As a Gulf Coast-based operation, we have always operated with a business model that is optimized for—and committed to—rapid delivery of emergency power supplies both before and after major weather events. Our partnership with Northstar is a natural extension of this commitment and will make it easier for us to provide assistance to businesses outside our core service region."

Under the terms of the MSA, WPP will become a registered vendor with Northstar. This will enable WPP to process orders and ship equipment to Northstar immediately, without any restrictions.

"Northstar's desire to partner with us is a testament to WPP's track record of excellent and prompt service, including delivery of emergency power supplies in as little as four hours, depending on location and availability," says Lum. "Our commitment to providing quality power-generation equipment quickly isn't just a business approach—it's a professional responsibility that we look forward to meeting, every day."

For more information on Northstar Recovery Services, visit *www.lviservices.com.*

For more information about Worldwide Power Products, visit: *www.wpowerproducts.com.* ■

Wang to Join Intertek-ETL's Power Systems Group

Intertek is pleased to announce a significant addition to its Power Systems Services capability in the Midwest. Edward Wang has joined the company as a Senior Project Engineer. Spending nearly 15 years with Cummins Power Generation as a Technical Project and Design Engineering Leader, Mr. Wang brings a wealth of knowledge and experience in the Power Systems industry to Intertek. "We are delighted to have Edward join our group as we continue to expand our market share in this industry.", said Brad Affeldt, District Sales Manager in Minnesota.

Mr. Wang has been involved in many innovative design launches and component solutions. He has also led design teams which have been responsible for leading several new product introductions, designing one of the first Tier 4i products, as well as designing one of the first generator sets to be listed to UL/ANSI 2200. Mr. Wang holds Bachelors and Masters Degrees in Mechanical Engineering.

For more information please visit, *www.intertek.com.* ■

McPherson Controls

"making the complicated Simple..."

Genset Controls & Excitations Solutions

UL 125Amp 2Pole ATS

ADVR-2200M

EA-150FW

ADVR-053

ADVR-12

ATS-22

ATS-PLC

GCU-3000

MTS Power Products

TEL : 305-634-1511 FAX : 305-634-1461 4501 NW 27 Ave MIAMI FL 33142

Email : sales@mtspowerproducts.com Website : www.mtspowerproducts.com

McPherson Controls

KUTAI

Now you can see your critical power management systems like never before.

ASCO PowerQuest® The vision to see what others can't.

PowerQuest delivers the answers you need about your Critical Power Management System (CPMS) — precisely when you need them. Finally, there's one single gateway to reliably monitor all the critical power data points in your facilities.

- Communicate, monitor and control power transfer switches, generator paralleling switchgear, gensets, breakers, loadbanks, and more
- Review test schedules, event logs, power reports and trends
- Add and shed loads based on capacity and priority
- Analyze power quality issues with precise sequence of events recording
- Enjoy dynamic visualization over flexible, convenient and secure systems

ASCO's PowerQuest. The singular solution to manage your critical power infrastructure.

www.EmersonNetworkPower.com/ASCO • (800) 800-ASCO • ascoapu.com

ASCO Power Switching & Controls
Just another reason why Emerson Network Power is a global leader in maximizing availability, capacity and efficiency of critical infrastructure.

ASCO®

CPMS

EMERSON™
Network Power

Emerson and ASCO are trademarks of Emerson Electric Co. or one of its affiliated companies. ©2013 Emerson Electric Co. CS104QR ASCO Power Technologies

EMERSON. CONSIDER IT SOLVED.™